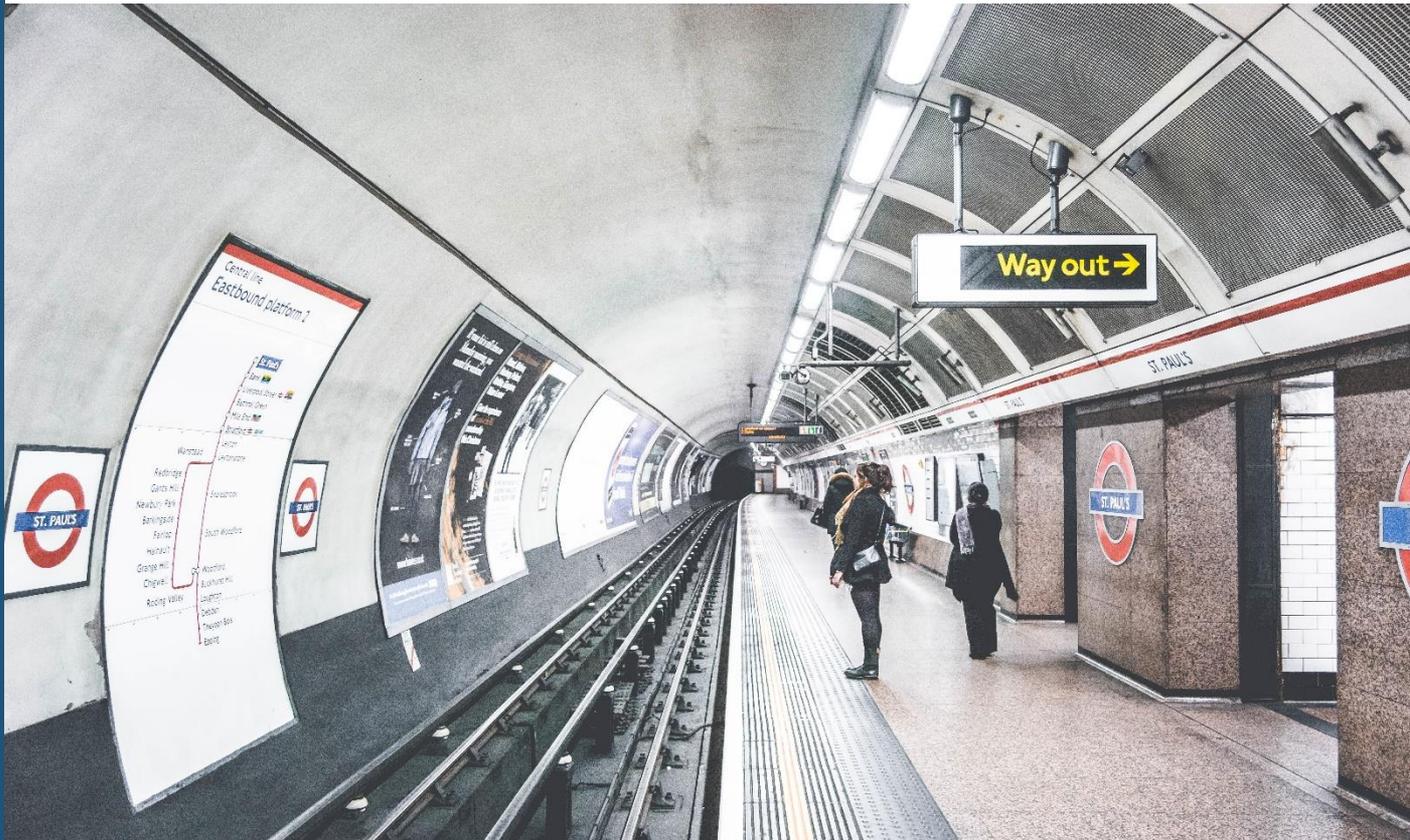


COST Action TU1203:

Crime Prevention through Urban Design & Planning



Crime Prevention, Transport and Mobility

December 2016

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Foreword

What is COST?

COST – European Cooperation in Science and Technology - is an intergovernmental framework aimed at facilitating the collaboration and networking of scientists and researchers at European level. It was established in 1971 by 19 member countries and currently includes 35 member countries across Europe, and Israel as a cooperating state. COST funds pan-European, bottom-up networks of scientists and researchers across all science and technology fields. These networks, called 'COST Actions', promote international coordination of national-funded research. By fostering the networking of researchers at an international level, COST enables break-through scientific developments leading to new concepts and products, thereby contributing to strengthening Europe's research and innovation capacities. COST's mission focuses in particular on: building capacity by connecting high quality scientific communities throughout Europe and worldwide; Providing networking opportunities for early career investigators; Increasing the impact of research on policy makers, regulatory bodies and national decision makers as well as the private sector. Through its inclusiveness, COST supports the integration of research communities, leverages national research investments and addresses issues of global relevance. Every year thousands of European scientists benefit from being involved in COST Actions, allowing the pooling of national research funding to achieve common goals. As a precursor of advanced multidisciplinary research, COST anticipates and complements the activities of EU Framework Programs, constituting a "bridge" towards the scientific communities of emerging countries.

In particular, COST Actions are also open to participation by non-European scientists coming from neighbor countries (for example Albania, Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Jordan, Lebanon, Libya, Moldova, Montenegro, Morocco, the Palestinian Authority, Russia, Syria, Tunisia and Ukraine) and from a number of international partner countries. COST's budget for networking activities has traditionally been provided by successive EU RTD Framework Programs. COST is currently executed by the European Science Foundation (ESF) through the COST Office on a mandate by the European Commission, and the framework is governed by a Committee of Senior Officials (CSO) representing all its 35 member countries. More information about COST is available at www.cost.eu

COST action TU1203: Crime Prevention through Urban Design and Planning (CP-UDP)

The focus of COST Action TU1203 is Crime Prevention through Urban Design and Planning (CP-UDP). The Action was chaired by Professor Clara Cardia of the Polytechnic University of Milan, Italy. Clara Cardia completely unexpectedly died April 30th 2015. From then on Dr. Umberto Nicolini of LABQUS Milan chaired the COST action.

The Action comprises country representatives from European countries and some partnership countries. The countries presently involved are: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, FYR of Macedonia, Germany, Greece, Hungary, Ireland, Israel, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom. Its objective is to make a substantial advancement towards the goal of building "safe cities". Studies have proved that there is a correlation between the structure and organization of urban space and crime: new criminological theory supports this point of view. The Justice and Home Affairs Council of the EU has underlined that crime prevention through design and planning is a successful and effective strategy for crime prevention and needs to be supported. Despite this, new projects are being implemented all over Europe without considering safety criteria, creating urban areas where crime and fear of crime make life difficult. The Action develops new knowledge and innovative approaches putting together theoretical thinking and practical experience. Thus the scientific program forecasts to work simultaneously on one hand on the innovative approaches deriving from research and experts, on the other hand on the know-how acquired through best practical experience. It brings together, value and disseminate the local research and experiences of participating countries, thus contributing to building a body of European expertise in the field of CP-UDP. It also uses its wide network to promote awareness, hoping that at the end of the Action more countries and decision bodies will be aware of the importance of incorporating crime prevention principles in planning decisions and projects.

From the Chair and the Core Group

The activity of COST Action TU1203 is organized along two main courses: producing innovative thinking in CP-UDP on one hand; and consolidating and diffusing existing knowledge on the other.

- The Action achieves the first course - innovative thinking - through working groups and invited experts which will develop new issues of environmental crime prevention, such as theories, private public partnerships, new technologies, new partnerships between police and planners, new implication of local authorities etc.
- It approaches the second course mainly through case studies located in different European cities. Each of the case studies focuses on aspects that are of major importance for the Action, and were organized by the hosting city with the support of the Action Core Group.
- The dissemination goal is considered of crucial importance and it is achieved, starting from the first year, by building networks of communication at international as well as the national levels. These networks are used for diffusing step by step the knowledge acquired by the Action.
- In order to make the results of the thematic working groups and the case studies immediately available to the Cost TU 1203 community and to the larger network it has been decided to produce a series of booklets, which develop the approached subject in short and synthetic form and are conceived so s to be easily readable to persons coming from different backgrounds. This booklet in thus one in a series.

See for the most recent information on this COST-action TU 1203: <http://costtu1203.eu> and http://www.cost.eu/domains_actions/tud/Actions/TU1203



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Introduction

By Inga Stankevice (Lithuania)

More than a half of the world 's population live in cities, and this number is increasingly growing. This has put urbanism at the top of the world agenda. "The implementation of the UNHabitat New Urban Agenda contributes to the implementation and localization of the 2030 Agenda for Sustainable Development in an integrated manner, and to the achievement of the Sustainable Development Goals and targets, including Goal 11 of making cities and human settlements inclusive, safe, resilient, and sustainable." Our timely COST action focuses on safe cities by asking critical urban questions. Many of us have noticed that living in a city is attractive, convenient, safe... but not always. Have you ever felt somebody 's cold stare at your back and remember the feeling of insecurity it caused? Have you ever held your brief when approaching a stranger walking straight towards you in the dark? Do you feel clueless about what contributes to transforming „not always “ into „always “?

At all times, crime has been one of the major concerns of many cities around the world. It is the basic threat faced at any level - individual, group, organizational, national, regional, or global. Nowadays, intense global competition and talent hunting hustle cities to offer a set of qualities to attract human and financial resources, such as skilled and creative professionals, smart businesses, or investors. For all of them (i.e. for all of us), public safety and security is almost equally important, and therefore, the need to ensure safety is one of the most important priorities of a city 's local government, higher-level policy-makers, urban planners and architects, researchers, and other practitioners.

While crime in private areas is mostly associated with social and financial factors, crime in public places has also much to do with the spatial structures surrounding it. Public transport facilities constitute an important part of a city' s spatial structure and contribute a lot to the city' s level of vitality and security. Hence, the design and management of public transport facilities are ones of the fundamental tools to inhibit crime. This is why the authors of this book contribute to increasing the safety of pedestrians at parking lots, public transport stops, bus and railway stations, and just on the streets.

Hence, Matijosaitiene, Velicka and Stankevice analyze the design and surroundings of public transport stops in relation to safety in Kaunas, and, being representatives from the areas of social sciences, urban planning and police, propose both social-legal and spatial solutions to inhibit crime. However, cyclers also form an increasingly significant part of a city' s transportation system. So, Troeva, Mladenov and Grigiriva' s paper is directed towards cycling safety and security, the reduction of the number of victims not only in traffic accidents, but also of crime, violence, and antisocial behaviour. Vanderstraeten also contributes to increasing the security of people while

being mobile. For this, he analyzes the handbook 'Planning, urban design and management for crime prevention' and supplements it with his own recommendations.

Other authors not only made research on the topic, but also have already brought some of its lessons to life. In this way, Erdősi et al. present the contents and results of a user-involvement-based project aimed at prevention of antisocial behaviour and increase in customer satisfaction on a bus and at the bus stops. Another article submitted by Simonetti crowns the partnership of a transport company Azienda Trasporti Milanesi, the Municipality of Milan and the Urban Quality and Safety Lab (now LabQUS), who worked together with their specific knowledge and competences in order to define new methodologies to approach the requalification actions on the urban outskirts.

Other authors of the book tend to concentrate more on the public transport infrastructure and its design-related aspects in terms of security. Persov et. al. examined security challenges at the central bus stop in Jerusalem, as well as the design characteristics of the physical structures at the Light Rail stations. Similarly, Hanocq and Dufert describe the case of Liège-Guillemins railway station and its surroundings, and suggest strategies and proposals to increase safety on intermodal hubs through architectural quality design. Schmeidler and Maršálková, whose duet is a result of a fruitful collaboration between the Czech Ministry of Justice and Brno University of Technology, highlight crucial aspects for the security of pedestrian mobility. Further, Matijosaitiene and Dambriunas verify if parking lots in Lithuanian post-Soviet cities meet safety standards, and identify elements of urban environment which affect crime rates on parking lots.

Because of the large and diverse audience interested in security – policy-makers, urban planners, researchers, businessmen, etc., the book integrates different approaches arising from different disciplines, practices, and cultures, and presents a comprehensive picture of means aimed at preclusion of crime risks. So, it is not surprising that not only academics, but also practitioners (e.g. a ministry, transport company) have made their significant input into the book.

However, from the scientific point of view, the book may be considered valuable because it integrates solutions and crime prevention strategies arising from both social sciences, urban planning, architectural design and transport management. Hence, the book covers a number of conceptual approaches such as routine activity theory, defensible space theory, surveillance strategy, access control strategy, territorial reinforcement, image management, activity support; others differentiate between spontaneous, semi-spontaneous and organized surveillance.

Last but not least, it is important to emphasize that accordingly with the social nature of crime, the book unites case studies from countries with different social and cultural traditions – Belgium, Czech Republic, Hungary, Israel, Italy, Lithuania. Hence, the book is saturated with various cultural backgrounds and better helps us to master essential techniques to increase safety in any society and community. So, just turn the page and become the best designer of public transport facilities, or their smartest user.

1. Why Are Public Transport Stops Unsafe?

Irina Matijosaitiene, Inga Stankevice, Vilius Velicka (Lithuania)

1.1. What works, what doesn't?

Currently, more than 50 percent of the world residents live in cities, and this number is going to increase. As cities become attractive targets for potential criminals, urban resistance to crime has become a focus of a number of researchers, practitioners, and policy-makers, being urban planning one of the tools to deter criminal attacks. However, controversial findings on the topic make it difficult to properly adopt the gained knowledge.

Hence, routine activity theory is predominantly concerned with various motivators as factors inducing crime, e.g. attractive (for offenders) targets and opportunities, absence of an effective guardianship against crime, etc. Similarly, defensible space theory argues that it is necessary to create restricted access (or single use) areas in order to deter criminals from committing a crime (Newman, 1972). So, routine activity theory emphasizes the opportunities to attack, whereas defensible space theory emphasizes the opportunities to defend. More often than not, both theories are seen as traditional security tools that focus on fences, walls, alarms, police officers and guards on the streets.

Another important line of research on spatial location of crime embraces a number of approaches related to "eyes on the street" (Jacobs, 1961). For instance, natural surveillance and activity support strategies argue that the more a location is visible and accessible to residents, by-passers and police, the more secure it is. Hence, more windows, doors, intensity of human flows increase safety. Similarly, according to access control strategy, it is necessary to make paths, entrances, exits, etc. visible and easily accessible. Ultimately, maintenance strategy adds that it is important to keep an environment tidy, aesthetic and well-maintained (Matijosaitiene, Dambrionas, 2015).

Without doubt, each of the aforementioned approaches has a number of real-life stories behind it, so what truly works, what doesn't? Keeping in mind that public transport stops are both objects which can attract criminals (i.e. more people, more targets; no restricted access areas at the stops) and deter them from attacking (i.e. more people, more activity and surveillance; better access and visibility), we have analyzed the stops in Kaunas city, Lithuania, to identify which of environmental factors foster crime and which ones inhibit it. Our initial goal was to define the extent and direction of the impact of environmental factors on crime rates at the stops via regression analysis. However, the intermediate findings deterred us from further analysis. Do you want to know why? You are more than welcome to read the whole article.

1.2. Research Methods and Objects

140 bus stops in Kaunas, Lithuania, with surrounding urban spaces were analyzed on site, with 135 crimes committed – 96 crimes committed at daytime and 39 crimes at nighttime (both daytime and nighttime crimes are mostly administrative crimes committed during 2013-2015 and registered by the Police) (Figure 1.1.). For the assessment of public spaces with bus stops and surrounding spaces, as well as the bus stops themselves, the questionnaire with 56 questions was developed. The biggest part of the questions about the typology of surrounding buildings (commercial, industrial, recreational, residential up to five storeys, residential more than five storeys etc.), various elements of natural surveillance, access control, territoriality, maintenance and activity support are YES/NO answers. The number of visible doors and windows, the distance from the bus stop to the nearest window, as well as the opening hours of activity objects were counted, measured and registered on site. Pedestrian flows in public spaces with bus stops were being calculated during 15 minutes at daytime in between 6:30-20:30 hours. The connectivity of spaces was measured according to the space syntax method (developed by Bill Hillier) and serial vision theory (developed by Gordon Cullen). The spaces are considered to have a connection if they have a common edge and if a passenger can enter one space from another through this edge. For instance, if two spaces have a common edge, but there is a fence with no entrance on the edge, the connectivity between these two spaces equals zero. The connectivity of spaces is corresponding with the assessibility.

Geographical Information Systems (GIS), as well as IBM Statistics 20.0 were applied for the data analysis and visualization.

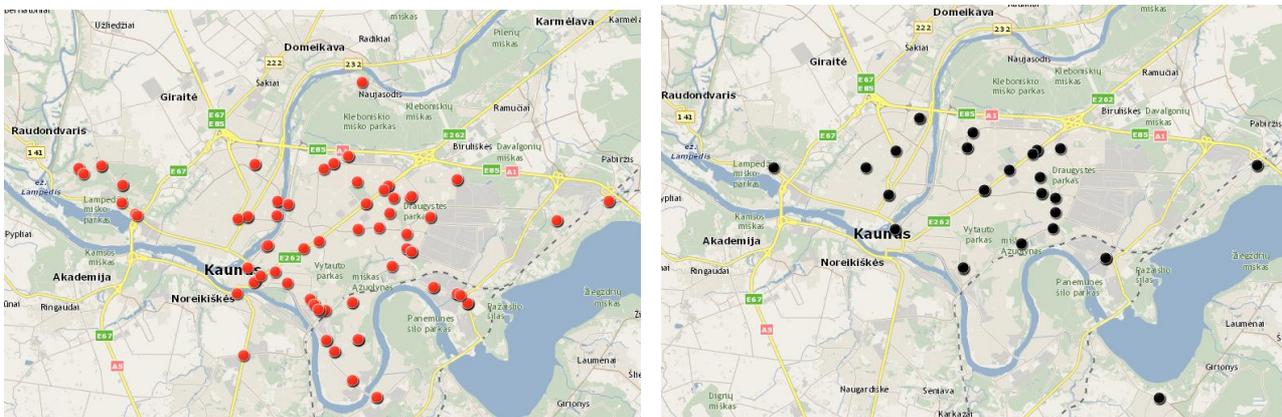


Figure 1.1. Crimes committed in Kaunas bus stops in 2013-2015: Left – red dots mean daytime crimes, Right – black dots mean night time crimes.

As five variables are scale ones, and the rest of the variables are rank, the analysis was twofold. First, the correlation analysis was performed with the scale variables, then the rank variables were made subject to factor and correlation analysis. The findings are presented below.

1.3. Findings

Doors, windows, people, and adjacent sites: numbers

The correlation analysis was performed with four different samples, i.e. with all the sample stops, with the stops with at least one daytime incident, with the stops with at least one nighttime incident, and with the stops with at least one incident, be it daytime or nighttime.

The analysis of all the sample stops ($N = 140$) has shown very weak and statistically insignificant correlations between nearly all scale variables and the crime rates. In fact, the only weak, but statistically significant correlation has been established between the number of spaces connected/accessible from a stop with the number of incidents occurred during nighttime ($r_s = 0.277$, $p = 0.01$) and with the total (during day or night) number of incidents ($r_s = 0.271$, $p = 0.01$).

By limiting the data sample to the stops where at least one incident occurred during daytime ($N = 49$), the other scale variables entered the game. The number of doors accessible from the site has demonstrated a negative correlation with the total number of incidents ($r_s = -0.307$, $p = 0.05$), meaning that the more doors there are, the fewer incidents occur. Also, the intensity of human flows during the daytime has a negative relationship with the daytime incidents ($r_s = -0.288$, $p = 0.05$), showing that more by-passers mean lower crime rates during the daytime.

The limitation of the sample to the stops where at least one incident occurred at nighttime ($N = 19$) lead to the identification of a bit stronger correlations. Hence, the fewer doors are accessible from the stop area, the more incidents occur in general, both during the day and night ($r_s = -0.465$, $p = 0.05$).

Ultimately, the analysis of the stops where at least one incident occurred ($N = 62$) has shown only one statistically significant correlation. It is the negative relationship ($r_s = -0.322$, $p = 0.05$) between the number of doors accessible from the stop area and the total number of incidents, thus showing that fewer doors mean more incidents.

Doors, windows, people, and adjacent sites: discussion

To summarize the results, we can notice that the connectivity / accessibility to other spaces makes a stop definitely more dangerous, especially during the nighttime, when numerous paths from other spaces become attractive points of attack. It seems that this finding corresponds to access control strategy which says that minimizing entrance points to the site contributes to greater safety.

As to the number of accessible doors, the more it is, the safer public transport stops are. The doors may mean the possibility to escape or to enter. According to routine activity theory, properly planned doors inhibit from committing a crime as they help to create spaces with restricted access

to strangers, e.g. spaces behind the doors. Natural surveillance and activity support strategies, in turn, make it clear that behind the doors, there may be unexpected surveyors who may deter criminals. So, both approaches work in this case.

It is interesting that despite the definitely positive impact of doors, windows haven't shown any clear relationship with crime rates at all. The average number of windows from which a bus stop can be observed is ~50 at the stops where at least one crime was committed, and it is ~49 at all the sample stops, thus meaning that windows, differently from doors, do not threaten criminals. However, the average distance from the closest window is ~38 m at the stops with at least one incident, and it ~35 m at all the sample stops on average. Hence, even though windows are less threatening to criminals than doors, they still tend to commit crimes at stops where windows are a bit more distant.

The trickiest result is that of human flows. More intense human flows mean lower daytime crime rates at the stops with daytime incidents.

These contradictory results make us go into other details related to human flows. So, the average number of by-passers at the stops with daytime incidents is ~50 passengers per 15 minutes, thus meaning that more people mean actually more "eyes on the street" or more natural surveillance. Therefore, in our case more people at the stops and, respectively, greater natural surveillance and activity, do deter crime.

Other environmental factors: Eta correlations

Eta correlation between the environmental factors and crime rates has not revealed any moderate or stronger correlations. Mostly, the correlations are very weak ($r_{\text{Eta}} < 0.1$), being crime a dependent variable. Interestingly, when the environmental factors are analyzed as dependent of the crime rates, correlations are stronger, typically $0.1 < r_{\text{Eta}} < 0.3$. This may mean that, regrettably, they are not environmental factors which affect the behavior of criminals, but vice versa, crimes committed by offenders make the policy-makers react and change environmental factors. Unfortunately, such an attitude is not proactive, but reactive. Moreover, as the correlations are weak, one can also question the adequacy of the actions taken to inhibit crime.

Other environmental factors: factor analysis

However, to make the relationships between the environmental factors and the numbers of incidents clearer, factor analysis was carried out. Because the appropriateness of principal component analysis requires the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA) be greater than 0.5, and the factor solution should explain at least half of each original variable's variance, several variables were excluded. When the analysis was completed, KMO equaled 0.722, Bartlett's test of sphericity showed $p = 0.000$. The rotated component matrix has identified nine

logically coherent factors (Varimax rotation, 29 iterations) which explain as much as 68.038% of the total dispersion:

- ✚ Overall tidiness and aesthetics: tidy roads, sidewalks on the stop site (L = 0.835) and adjacent sites (L = 0.669); the stop area (L = 0.824) and adjacent areas (L = 0.566) are aesthetic and visually attractive; the stop is tidy, well-maintained (L = 0.703); stop constructions are colored and non-damaged (L = 0.593).
- ✚ No antisocial behavior or trash: no drunk people on the stop site (L = 0.652) and adjacent sites (L = 0.682); no pubs or similar places characterized by antisocial behavior (L = 0.627); no trash on the stop site (L = 0.659) and adjacent sites (L = 0.625).
- ✚ No storage of abandoned things: no abandoned things (e.g. pieces of furniture) are kept on the stop site (L = 0.794) or adjacent sites (L = 0.780); there are no attributes of vandalism at the stop (L = 0.642).
- ✚ Clean-cut greenery: the greenery is tidy at the stop (L = 0.784) and on the adjacent sites (L = 0.655); trees are up to 2.1 m on the stop site (L = 0.628) and adjacent sites (L = 0.668); grass is mowed down in the stop area (L = 0.475).
- ✚ No vandalism: graffiti is absent at the stop (L = 0.799) and on the adjacent sites (L = 0.625); no vandalism attributes on the adjacent sites (L = 0.493).
- ✚ Clean walls and constructions on adjacent sites: constructions are colored and non-broken in the adjacent areas (L = 0.808); walls and constructions of adjacent buildings are clean and well-maintained (L = 0.599); environment in adjacent sites is tidy and well-maintained (L = 0.523).
- ✚ Clean-cut bush: bush is below 0.91 m. on the stop site (L = 0.761) and adjacent sites (L = 0.761).
- ✚ Good visibility: there is no place on the site where one could hide (L = 0.820), greenery does not create poor visibility areas (L = 0.700); a person can be seen and heard from any place on the stop site (L = 0.583).
- ✚ Transparent and clean walls: stop walls and constructions are clean and well-maintained (L = 0.825); stop walls are transparent (L = 0.600).

Other environmental factors: Spearman correlations

In the sample of all the stops (N = 140), as well as in the sample of stops with at least one incident (N = 62) and in the sample of the stops with at least one daytime incident (N = 49), no significant correlations were identified between crime rates and emerged components. However, a few significant correlations analysis results reveal some relations between the environmental factors and both daytime and nighttime crimes.

The component "No vandalism" is moderately negatively correlated with the rates of daytime crime ($r_s = -0.475$, $p = 0.05$). It means that the fewer vandalism attributes there are at the stops and on the adjacent sites, the fewer incidents happen during the daytime. This finding is supported by maintenance strategy.

On the contrary, "Good visibility" is positively related with the daytime crime rates ($r_s = 0.463$, $p = 0.05$), thus showing that good visibility of the stops attracts criminals. Interestingly, even stronger, but positive correlation was identified between "No storage of abandoned things" and the number of incidents at night ($r_s = 0.561$, $p = 0.05$). Interestingly, this means that nighttime incidents happen at the stops where abandoned larger things like furniture pieces are *not* stored, differently from what access control, natural surveillance and activity support approaches suggest. It looks like better visibility and access contributes to greater crime rates, not the opposite.

At the same time, these findings contradict to the fact that the stops with transparent walls and, respectively, better visibility are, in general, safer than the ones with non-transparent walls; and the stops without pavilions at all are the safest. In this way, at the stops with non-transparent walls, there are 0.83 criminal attacks on average (0.59 – daytime, 0.24 – nighttime). At the stops with transparent walls, there are 0.80 incidents on average (0.55 – daytime, 0.25 – nighttime). At the stops without pavilions, there are 0.27 incidents on average, all committed during the daytime.

On the other hand, we should also admit that the difference in the average numbers of incidents among the stops with pavilions is very tiny: 0.83 vs 0.80, 0.59 vs 0.55, and 0.24 vs 0.25. In comparison to the stops without pavilions, the average crime rate there is considerably lower. So, this makes us assume that clearly signposted public transport stops attract criminals rather than deter them. And this conclusion, again, speaks against access control and maintenance strategies, and in favor of routine activity theory.

1.4. Conclusions and Recommendations

- ✚ Interestingly, but more often than not, our findings contradict to what the Standard CEN 14383 and a number of theories, especially natural surveillance, suggest. Such factors as better connectivity / accessibility to and from other spaces, clearly signposted public transport stops, which are not overwhelmed with unnecessary bigger items such as, for example, furniture pieces, are associated with higher crime rates. In addition, better visibility, i.e. where vegetation does not create poorly visible spaces and where there are no places to hide, also contributes to higher crime rates.
- ✚ These facts speak predominantly in favor of routine activity theory which argues that offenders use each and every opportunity to attack. In our case, better visibility and connectivity/accessibility mean better opportunities to attack and run away, and more intense pedestrian flows mean more "eyes on the street" .
- ✚ We assume that the aforementioned peculiarities are conditioned by the insufficient extent of social capital in Lithuania. Offenders know that more apathetic eyes (having in mind good visibility) do not mean more contra-actions against criminal attacks because the residents are apathetic, they don't care about what is happening outside their property or away from

them. Not surprisingly, in comparison to the world's and Europe's public safety rates, Lithuania's evaluation performed by the United Nations Office on Drugs and Crime (UNODC, 2012) is still rather weak. We have also found out that the current crime prevention policies concerning public transport stops are reactive rather than proactive. The adequacy of the actions taken to inhibit crime can also be questioned.

- ✚ Therefore, it is necessary to develop and implement effective crime prevention programs, including crime prevention through environmental design (CPTED). The Ministry of the Interior of the Republic of Lithuania also emphasizes the necessity of preparation of CPTED recommendations for Lithuania in order to create safe urban environment via a number of interactive social and spatial tools. As the Standard CEN 14383 suggests, it is necessary to further study and assess various surveillance measures in order to properly design and manage public transport facilities. Last but not least, it is essential to increase the potential for informal surveillance and positive ownership which, unfortunately, is rather weak at the moment.
- ✚ However, we cannot conclude that environmental factors do not have any impact on crime rates at all. Contrarily, we have found out that the absence of graffiti and other attributes of vandalism is associated with lower crime rates during the daytime, thus confirming that aesthetics matters (Matijosaitiene, Stankevice, 2014). We have also found out that, currently, doors are the best deterrents of crime: the more doors can be accessed from a public transport stop, the lower crime rate is there. However, crimes are typically committed at public transport stops where windows are less proximate to them.

2. Cycling Safety and Security

Vesselina Troeva, Dejan Mladenov, Sonia Grigorova (Bulgaria)

2.1. Introduction

In the last two decades cycling is taking yet a bigger share in the modal split and is an inherent part of the integrated plans for smart urban mobility. The cities, signed the Charter of Brussels during the Velo-city®2009 conference are engaged to increase the average of cycling share to 15% or even more, where this figure is already achieved, until 2020¹. The proportion of the cyclists depends on the traditions in daily commutes, including going to school/university on bike, on the existing infrastructure, climate, relief and safety.

Cycling is in the basis of a variety of initiatives in different cities in the world as an attempt to achieve not only energy efficiency in transportation, but also to reduce the gass emissions and pollutants, to improve the quality of the environment and to change the culture of the participants in the urban mobility pattern. The positive effects of cycling on the human health are also taken into consideration in urban planning, when the consequences of obesity is an important issue. Part of these initiatives are directed towards cycling safety and security, the reduction of the number of victims not only in traffic accidents, but also the victims of crime, thefts, violence and antisocial behaviour.

2.2. Research Methods

The methods used for studying the topic of cycling safety and security and crime prevention in transport planning, through design, administrative and technological measures include:

- ↘ Documentary analysis of scientific publications and research on cycling planning and management and results from crime prevention measures, introduced in different cities. The findings could be used by planners and engineers, as well as by the local authorities while planning and constructing the cycling network.
- ↘ Surveys carried out in 2015 among 341 cyclists in several big cities in Bulgaria², supplemented by results from an earlier interview with 1000 cyclists in the country by the BikeEvolution association, giving information for the risk zones in the cities, for most frequent crimes against cyclists and ideas for crime prevention. The surveys results (Fig. 2.4.) are compared with similar telephone or on-line surveys with sitizens of Dublin, Barcelona, Amsterdam and Calgary.

¹ According to the data of ECF 2013 the modal share of cycling is 35% in Copenhagen (data source from 2010), 32% in Amsterdam, 13% in Berlin, 11% in Helsinki, 7,9% in Dublin, 6% in Vienna, 5% in Paris and 3% in Sofia (2010) <https://cyclingindustry.news/five-key-cities-where-cycling-is-taking-modal-share-from-cars/>

² BikeEvolution survey, 2015. Available in Bulgarian at <http://velobg.org/tag/>

- ↘ Case study analysis from different European countries, synthesis of findings and recommendations for implementation in the cities with less experience in planning, organisation and management of cycling infrastructure and its security.

Types of infrastructure

A study of cycling safety includes different elements of the infrastructure, among which the overall network of bicycle paths and lanes, bike parking areas and organised public bike share systems (Fig. 2.1.). The links between the cycling infrastructure and the public urban transport – underground, railway and bus stations, public transport stops and interchange places etc., the connections with the most important public spaces and pedestrian zones in the urban structure, with the green system and the suburban areas, where the recreational facilities are located have also been examined. The basic conclusion is that the cycling safety and violence and thefts protection of cyclists do not require different measures, than the ones for pedestrians. The differences are due to the fact that the bicycle itself is an object of crime, especially when its price is higher.

According to the European Environment Agency (EEA) statistics Helsinki is the leading city with 8.9 km/km² cycling paths and lanes per city area in 2012, followed by Copenhagen, Stockholm, and Hannover³ with twice less. The continuous growth of the number of cyclists makes planning and construction of the cycling system in the cities a priority of the urban development and regeneration strategies and plans. Along with the technical regulations and standards for traffic safety, a lot of projects for tolerance and new mobility culture are executed. This is very important for countries without strong traditions in cycling and where planning and construction of the bicycle lanes within the existing and dense urban fabric is a difficult task.

As mentioned above, the promotion of cycling in the cities is in the centre of a number of various campaigns and initiatives during the last few years in different parts of the world. One of the main goals of these initiatives is the reduction of urban crime and bike thefts, because the latter is considered one of the main reasons for not cycling after a bike has been stolen.

Among the main reasons for bikes thefts is the lack of sufficient convenient and safe bikes parking. Bicycle parking facilities most often are constructed close to the railway stations, in the countries at which this type of transport plays an important role in regional transport and commuting, close to underground entrances or interchange stations and transportation hubs, at the shopping and administrative centres, pedestrian zones and tourist attractions, offices, libraries, universities and schools. Usually they are combined with the car parking areas and thus use the existing surveillance and control systems (Grönlund, 2013).

³ <http://www.eea.europa.eu/data-and-maps/figures/cycling-paths-and-lanes-in-european-cities>

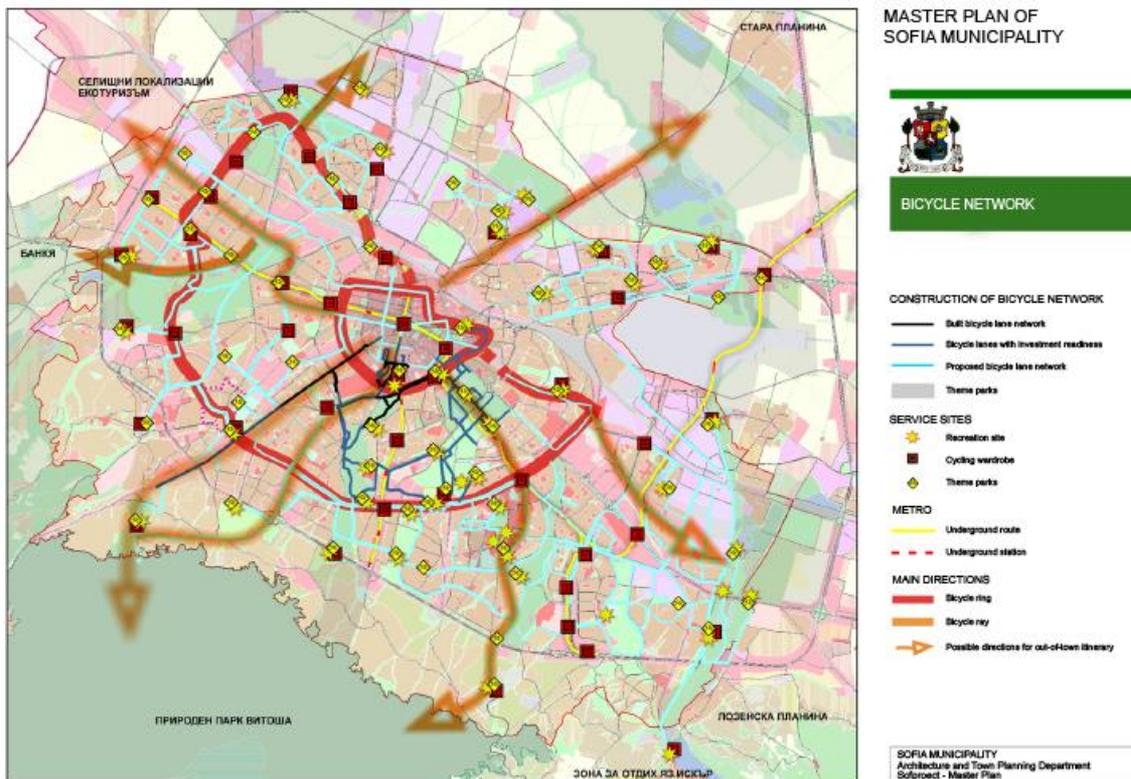


Figure 2.1. Bicycle network scheme. Master plan of Sofia municipality, adopted 2009, updated 2016

The bike sharing system has been introduced for the first time in 1965 in Amsterdam by a group of enthusiasts, who painted the bikes for free use in white (DeMaio, 2009). Most of these bikes were stolen or damaged turning the initiative, but nonetheless Amsterdam is still considered the most bike friendly city. In France the first bike sharing system was introduced in La Rochelle in 1974, while the first time magnetic cards were introduced in Renne (Shaheen, Guzman, Zhang, 2010). In 1995 a large scale scheme with 1000 bikes was launched in Copenhagen. In Bulgaria the first bike sharing system was introduced within the Integrated urban transport project of the city of Bourgas (2008), financed by the Operational programme Regional Development (2007 – 2013), together with the construction of the bike lanes network in the city and its sea garden. The period between 2008 and 2013 is considered the cycling boom due to the mass introduction of such public or privately managed systems. Only in Spain after the success of Barcelona, the system has been introduced in 33 more cities (Mingley, P., 2009)⁴.

The development of the new technologies facilitates their implementation for easy payment with iPhones apps, smart cards and wireless systems, for GPS tracking, thus making the system attractive for younger generations. Despite different data from different sources and publications from different periods, it is obvious that Spain, France and Germany are the leaders in the field.

⁴ Midgley, P., 2009. The role of smart bike sharing systems in urban mobility. Journey, May 2009 p 23 available at <https://www.lta.gov.sg/ltaacademy/doc/IS02-p23%20Bike-sharing.pdf>

Yet another system, corresponding to the new generation philosophies is the Open Source Bike Share, introduced in 2013 in Bratislava, Slovakia, as a low cost small scale bike sharing system with 50 bikes in the pilot phase, suitable for smaller communities, such as universities and companies (Fig. 2.2., 2.3.).



Figure 2.2. Bike sharing system, Barcelona, 2010.

Figure 2.3. Bike sharing system Torino University, 2012.

The main problems of the bike sharing systems are the vandalism and thefts. That is why the location of the stands in a safe and well controlled areas, close to the main pedestrian flows and busy zones is an important issue when planning the location of the interchange stations.

Location

The location of the elements of the bicycle network within the urban environment follows the logic of the transport system. The cycling lanes connect the housing areas with the places for work, education and recreation, shopping areas and transport services. The cycling network provides the missing links in the transport system 24/7, offer freedom of choice of route, type of mobility and movement speed. The concentration of the bicycle paths and lanes increases towards the central parts of the city, the points of conflicts are situated on the intersections of different traffic flows – cars, pedestrians, public transport. Quite often behind the aggressive and antisocial behaviour one could find lack of clear regulations for land use and space management. Reduction of these conflicts requires clear rules, education and information, as well as clear demarcation of different land properties and functions, delimitation between spaces for cars, pedestrians and cyclists, when a sharing space concept is not an option.

Crime, antisocial behaviour and fear of crime

The analysis of different format surveys, carried out between 2009 and 2015 in European and North American cities, quite often as part of campaigns, promoting cycling, prove that the thefts are considered the main obstacle for cyclists. Dublin Cycling Campaign Bike Theft⁵ shows 100% increase of the *bike thefts* between 2003 and 2013, in most cases as a result of the rising prices of bikes and the low financial charges on the thieves. The same study compared the results with the Netherlands and London. About 42% of Irish people reduce their use a bike, or stopped it altogether, after a theft, while for London the same percentage is even higher – 67%. That is why theft is considered the main obstacle for cycling. Between 2006 and 2010 the thefts in Dutch cities decreased by 33% as a result of joined efforts by the local authorities, traffic police departments, the representatives of the local communities, cyclists and business.

Roberies are usually not accompanied with threat and violence, because in most cases the bikes are stolen from a parking rack, from the street, from homes/appartments or from a place for bikes storage, when left unattended and unlocked. The low rate of insured, marked or registered bikes, as well as the low rate of declared thefts are among the reasons for small scale detection and retrieval of the lost property. The other reason is the inappropriate locks, that is why dissemination of information about locking systems and related advanced technologies should be one of the main issues in all cycling safety initiatives.

The second group of crimes against cyclists are the *threat, abuse, antisocial behaviour* which were predominantly discussed in the on-line survey in Bulgaria. They occurred in areas with high risks, with concentration of social problems, minorities, unemployed and roma population, as well as in dark areas. Such areas should be well marked and people should be informed to avoid them.

The third group - *crimes against property* are the ones connected with the public bike share system, damage of the facilities, racks and bikes, installed on public places. This type of public property is part of the open space furniture, sometimes connected with the urban technical infrastructure. The protection from crime is usually provided with the CCTV.

The overall results of the studies and surveys analyses show that a person on a bike feels more protected than a pedestrian, due to the possibilities to escape faster and to avoid accidents and offenders. This is too individual and depends on the character of the environment, space use and functions, on its maintenance and the implemented safety measures, on the location of bike routes and lanes, facilities, parking and racks, and on other social, demographic, economic and cultural factors, which have to be considered in each individual case.

⁵ <http://www.dublincycling.ie/cycling/bike-theft-survey-results>

2.3. Design strategies

The design strategies summarise the main issues, which have to be taken into account when developing integrated urban transport system documents, with particular attention to the factors, affecting the bicycle network and cycling safety.

Main land use

The network of bicycle lanes follows the development of the urban environment and its transport infrastructure. It covers the housing areas, public open spaces, office areas, educational institutions, shopping areas, industrial areas and provides links among them. It is connected with the main transport hubs, bus and tram stops, metro and railway stations, ports and more rare airports. It provides links with the suburban environment and places of recreation, along with the pedestrian areas and tourist routes. The latter are a result of the national traditions and culture, as well as of the increased share of bike tourism – extreme cycling, mountain bike, organised and individual bike trips and packages with social and economic impact.

The most intensive networks are at the central parts of the cities. GIS implementaion gives plenty of examples and illustrates this trends.

Accessibility and passenger traffic management [CEN 5.4.3.3]

Cycling provides variety of opportunities for mobile people, connects different urban areas and different types of transport. That is why it offers better accessibility and free mobility throughout the urban environment. Despite the well organised passenger traffic management systems, one should be informed about the critical locations and risky zones, especially the ones close to railway stations, bigger transportation hubs, dark urban parks and areas with registered high level of vandalism, violence and crime.

The bike parking areas also should be well illuminated, provided with cameras and video control, and their entrances and exits should be designed, considering safety criteria and standards.

Attractiveness [CEN 5.4.3.4]

The attractiveness of urban spaces, including the ones provided for cyclists, depends on the planning and design objectives and standards, implemented materials, the proper combination of hard and soft landscaping, but also on maintenance and use control. Well designed and constructed public spaces create respect, a sense of belonging and pride, and shape social behaviour. The cycling network within the city should be part not only of the urban mobility scheme, but of the overall system of public open spaces. It should follow the mobility pattern of the city and based upon the traditional routes for pedestrians and cyclists.

Lighting is another factor affecting reduction of crime and fear of crime. All bicycle lanes should be well illuminated, especially when they are isolated from the pedestrian flows and from the traffic lanes.

Legibility [CEN 5.4.4]

Territorial boundaries [CEN 5.4.4.2]

Territorial boundaries, in terms of separation of different uses and users, are related to the clear distinction between the spaces for bicycles and for pedestrians, for private cars and for public transport. The common shared opinion that the separation of public, semi-public and private spaces and segregation of uses creates higher level of fear and uncertainty is not applicable for cycling areas. Most of the interviewed people responded that the lack of clear signposting among different types of mobility spaces is in the basis of conflicts between participants in the mobility, stimulates aggressive and antisocial behaviour and is a factor for incidents and attacks. This is very important to be considered by countries with limited experience in cycling, who are newly introducing their integrated transport schemes. It will increase tolerance between different users of the public space and is an important factor for reducing not only traffic accidents, but antisocial behaviour, thus improving the urban mobility culture. With some additional information and measures, each participant – pedestrian, cyclist or car driver will clearly identify the space which he/she may use without additional arguments.

Visibility [CEN 5.4.4.3]

Visibility is obligatory for cycling not just because of traffic safety, but because of the need to reduce fear of crime and vulnerability. Well provided visibility by using appropriate transparent materials, by good location and design of the entrances and exits from transport facilities, improves safety of the environment. The selection and location of plants, mainly shrubs and trees, at the crossing points with pedestrian routes and with traffic lanes should be in compliance with good visibility. It helps to avoid accidents with pedestrians and car drivers, to reduce risk of crime. Entrances and exits to and from underground parking facilities should be well lit to reduce fear of crime and attack. The minimum use of blind walls along the bike lanes is also recommendable in order to avoid the accidents and 'no escape' feeling.

Such recommendations should be an addition to the technical regulations and design guidelines for bicycle lanes and infrastructure planning and design. All measures, recommendations and building standards implemented in the design of public open spaces and transport system elements (transport hubs, bus stops, railway and Metro stations, public parking spaces etc.) should be implemented for the cycling network as well. Similar rules should be applied for the installations of the bike sharing systems, the bike racks and charging components for the electric bikes, scooters and rollers.

Location compatibility with security measures [CEN 5.4.5]

Location compatibility with security measures should be taken into account at the pre-design stage during the feasibility studies for planning a cycling network in the existing environment. At that stage all requirements about accessibility, evacuation, security and safety services should be developed alongside with the ones for pedestrians, passengers, car drivers, visitors etc.

Management strategies [CEN 5.5]

The analysed strategic and planning documents for property management, responsibilities distribution and sharing, protection and maintenance of the cycling infrastructure, suggest that there is no need for additional requirements and regulations, due to the fact that cycling is considered an essential element of the integrated urban mobility.

The materials used in the design and maintenance of the cycling infrastructure are similar to the ones used for all other urban zones and public spaces, with respect to reducing crime and fear of crime, vandalism and violence, the feeling of mismanagement and neglect. The partnership schemes should be expanded with the cycling associations and NGOs working in the field, bike-police as part of the traffic police, urban mobility departments and private bike sharing companies.

Formal surveillance [CEN 5.5.2.3]

Introduction of specific measures for formal surveillance will be necessary only in the areas where the bike lanes are separated from the main pedestrian and traffic lanes, mainly in parks and gardens.

Regulating space usage [CEN 5.5.3]

Code of conduct [CEN 5.5.3.3]

A special issue on cycling safety should be part of the Code of conduct for the use of public spaces. These rules and regulations should be uploaded on urban mobility departments web sites, on bus stops and other convenient for reading public open and green places.

Information and training campaigns, related to cycling safety, should be organized with joint participation by all involved in the traffic – cyclists, car drivers, traffic police and local authorities, with special emphasis on children and teenagers as the most vulnerable group. This will increase the sense of community, responsibility and safety.

Initiatives tailored to specific population [CEN 5.5.3.4]

Initiatives for special needs groups of the society should be oriented towards the minority groups, persons with antisocial behaviour, drug and alcohol addicted people. These are the ones involved in accidents, violence and crime more often than the others.

Legibility and orientation [CEN 5.5.4]

Signposting, lighting [CEN 5.5.4.2]

Clear marking and lighting of the cycling infrastructure is planned in the design stage as part of the transportation schemes of the master plans. As part of the implementation of the plan and urban mobility scheme at public transport stops and public open spaces, it is necessary to stipulate provisions for transporting bikes on the public transportation vehicles.

An additional security measure on the bike lanes could be the contact points with the police and guards for direct free dialing in emergency, when a mobile phone is being stolen, damaged or lost. This is important for isolated places and the ones with no natural surveillance.

2.4. Recommendations and Conclusions

Some of the ideas from the online and telephone surveys could be summarized as basic recommendations for the specific cycling infrastructure:

- ✚ In order to encourage cycling, a construction of large bike parking with video surveillance or other type of security control should be planned and located close to the other transport facilities – railway and underground stations, hubs and interchange stations.
- ✚ Information for cyclists and tourists about the possible routes and zones with high risk of traffic accidents and crime should be provided on the web and on appropriate public places.
- ✚ Design and construction of barriers/signs between the pedestrian lanes and bicycle lanes and/or establishment of a signal system will give better orientation and awareness about the rules, the rights and obligations, especially in places, inappropriate for traffic mix or in the initial stage of the introduction of cycling networks.
- ✚ Establishment of bicycles tracking systems and their selling on unlicensed markets should be a joint initiative of the local authorities, traffic police and the business, as measures for reducing cycle thefts.
- ✚ Joint educational initiatives with representatives of different type mobile people and different social groups will improve communication and a sense of community among them, thus stimulating commitment and shared vision about the urban environment.

Cycling is part of the future smart urban mobility, which will make our environment better, cleaner and safer and will improve the quality of our life. That is why when planning for the future one should consider the bicycle infrastructure as an integral part of the transportation system, as well as of the urban environment.

Do you use public transport as part of your bicycle commute?

327 out of 341 people answered this question

1	Yes, please specify under which circumstances	172 / 53%
2	No, please indicate the reasons for not using public transport as part of your bicycle commute	155 / 47%

How often, while riding a bicycle, do you get in a pedestrian-related conflict situation (number occasions per month)?

338 out of 341 people answered this question

1	7-9	95 / 28%
2	Very rarely	92 / 27%
3	1-3	67 / 20%
4	4-6	51 / 15%
5	0-1	22 / 7%
6	Never	11 / 3%

Has your bicycle ever been stolen?

335 out of 341 people answered this question

1	No	206 / 61%
2	Yes	129 / 39%

Have you ever witnessed / been the victim of a theft (attempt) while riding a bicycle?

339 out of 341 people answered this question

1	No	283 / 83%
2	Yes	56 / 17%

Have you ever been in conflict with building managers because of parking (or locking) your bicycle in front of the establishment?

337 out of 341 people answered this question

1	No	187 / 55%
2	Yes	150 / 45%

Figure 2.4. Survey results, General report, Bulgaria 2015

3. Mobile People Security

Pierre Vanderstraeten (Belgium)

3.1. Introduction

The aim of this paper is to add some recommendations to the handbook 'Planning, urban design and management for crime prevention' ⁶ in view of the topic 'Mobile People Security' . These additions cope with the structure of the handbook and will therefore follow the same structure in the same order. They are coming from different experiences and expertises in the field of public space design and planning mainly in the northern part of Europe. They complete and specify the recommendations of the handbook in order to give them a broader spectrum.

Each paragraph starts with an extract of the handbook in italics, continues with a comment which argues for the complement and finish with a proposition of a new recommendation in italics and blue letters.

3.2. Considering Existing Social and Physical Structures (Handbook, pp. 14-15)

« *Edges of projects*

The borders of a project play a key-role in the connection with the surrounding urban fabric. Therefore, borders should be planned paying particular attention to the character of the adjacent areas, to new and existing flows, and to compatibility of functions, in order to avoid fractures in the urban system.

Edges of projects are critical areas because they can create discontinuities and contribute to the development of zones of dereliction. »

In the urban environment, people move by walking down the public spaces. Socio-spatially speaking, public space is the basic unit to be considered in relation to security and feeling of security. The fact that Jane Jacobs (1992) put in evidence 'the eyes on the street' highlights the importance of public space as the above all social and public life backbone.

However, one can astonishingly observe that edges of urban projects are in most of cases the public space - often the central line of the street. Regarding social and public life and more generally urban phenomena, this kind of edge is a priori unreal and definitely not relevant with the exception of some rare asymmetric situations. Therefore, It would be important to develop, as a kind of reflex, the habit of defining edges on the backside of the parcels even if it produces a

⁶ Action SAFEPOLIS (2006 - 2007) Handbook: Planning urban design and management for crime prevention (GLS/2006/AGIS/208)

convoluted form of area. It can notably help to be attentive and to avoid inward-facing urban layouts.

The suggestion for a revised subsection would be the following:

« Edges of projects

The borders of a project play a key-role in the connection with the surrounding urban fabric. Therefore, borders should be planned paying particular attention to the character of the adjacent areas, to new and existing flows, and to compatibility of functions, in order to avoid fractures in the urban system.

Edges of projects are critical areas because they can create discontinuities and contribute to the development of zones of dereliction. As public spaces are social and public life backbones, unifying spaces and not separating spaces, with the exception of some rare asymmetric situations (motorways, watercourses, ...), edges should be designed and drawn on the backside of the parcels and not on the public space. »

3.3. Guaranteeing Accessibility and Avoiding Enclaves (Handbook, pp. 16-17)

« The issue

Good accessibility and a capillary road network are essential to foster flows of movement which produce vitality, natural surveillance and therefore increase safety. To guarantee continuity of movements it is thus important to avoid fractures in the road and pedestrian networks..."

More and more often, the aim of integrating the sustainable design and planning of 'short distances city' (energy and climate stakes) with the development of shortcuts and back alleys, through new big blocks or too big existing blocks, comes into conflict with the will to develop natural surveillance and with the protection of the backsides and their possible secondary access. Jane Jacobs (1992) recommended planning "short blocks", blocks of an appropriate and balanced short size, nevertheless neither too small nor of course too big. Too small blocks open and expose the private and the backside sphere of behaviours and activities to the public space. This kind of layout reduces the effective natural surveillance that deploys normally on the frontside and produces the 'eyes upon the street' effect and increases the risk of burglary from backsides. Moreover, the balance between public and private is clearly disadvantageous for public finances. Inversely, too big blocks decrease the urban vitality and consequently security and feeling of security by deterring pedestrians who have longer trips and less choices.

The suggestion for a revised subsection would be the following:

« The issue

Good accessibility and a capillary road network are essential to foster flows of movement which

produce vitality, natural surveillance and therefore increase safety. To guarantee continuity of movements it is thus important to avoid fractures in the road and pedestrian networks. However, one must be attentive to keep a sufficient size of blocks in order to avoid devitalisation of a superfluous street network and to minimize burglary risks from back alleys. »

3.4. Creating Vitality (Handbook, pp. 18-19)

« Separating flows decreases vitality

On local roads, cars, bicycles and pedestrians all together create flows which are usually sufficient to provide natural surveillance. If these flows are separated on different routes, each of these has a lower level of surveillance. Therefore, in terms of crime prevention, local streets with mixed traffic are preferable.

Where only primary roads connect neighbourhoods, pedestrian movements are discouraged, and vitality is reduced. A continuous network of streets allows the distribution of flows, and avoids separating cars from bicycles and pedestrians. However, pedestrian safety should be studied carefully.

If separating flows on different roads decreases vitality, the same principle is true for each road. This is founded on the 'shared space' philosophy which enhances the multiple social uses of the public spaces and the place for pedestrians and cyclists. By removing all traffic, separation schemes and signs, shared public spaces get results in fewer casualties and more presence of pedestrians and cyclists through modal shift.

Even in our more and more numeric and global societies, streetscape continues to have important effect on well-being and on social activities and interactions. The quality and attractiveness of the public spaces can make people more inclined to walk, cycle and spend time in them. This increase of social appropriation gives more chance for natural surveillance and crime inhibitory and deterrent co-presence to be effective.

In shared public spaces, this co-presence is more activated because of the increase of the level of vigilance and mutual attention of all users (Fir. 3.1.). Furthermore, the share of public space due mainly to a significant reduction of traffic speed – most of the European highway codes (in Belgium and more recently in France, 'street code' takes the place of 'Highway Code' in cities) limit the speed at 20 km/h in shared spaces – often induces an activation of the frontside of the buildings served by this public space: in-between spaces, terraces, balconies, shop windows etc. All these architectural layouts which express the rich and complex relations of inter-signification between private and public spaces contribute greatly to the 'constitution' of the street (see Bill HILLIER in

Space Syntax theory) (Hillier, Hanson,1989) and to the aptitude of the front-sides to welcome activities and natural surveillance.⁷

Note that when reserved public transport lanes must be designed, it is important that the tram or the bus stop doesn't become a world of its own (Fig. 3.2.). As the figure 3.2. demonstrates, there are a lot of urban opportunities and social interactions for people waiting the public transport when the stop is integrated and makes clearly part of the sidewalk. This layout increases urban security and feeling of security.

The suggestion for a revised subsection would be the following:

« Separating flows decreases vitality

On local and supra-local roads, cars, bicycles and pedestrians all together create flows which are usually sufficient to provide natural surveillance. If these flows are separated on different routes, each of these has a lower level of surveillance. Therefore, in terms of crime prevention, local and supra-local streets with mixed traffic are preferable. Where only primary roads connect neighbourhoods, pedestrian movements are discouraged, and vitality is reduced. A continuous network of streets allows the distribution of flows, and avoids separating cars from bicycles and pedestrians. However, pedestrian safety should be studied carefully.

Furthermore, natural surveillance is strengthened when different users share the same space without any physical separation thanks, on one side, to the slowness, the mutual attention and the vigilance it induces and, on the other side, the spatial availability for the stay function of the public space.

In any case, when reserved public transport lanes have to be designed, one must avoid that bus or tram stops become a world of its own, completely detached from the social life of the sidewalks and too distant from the natural surveillance of the frontages. »

⁷ Pierre VANDERSTRAETEN, 2014, *Risk compensation theory*, in Working group 4 report on Crime prevention theories. COST action TU1203 'Crime prevention through urban design and planning' .



Fig. 3.1. Shared space, Place Communale de Molenbeek in Brussels, Belgium (photo by P. Vanderstraeten).

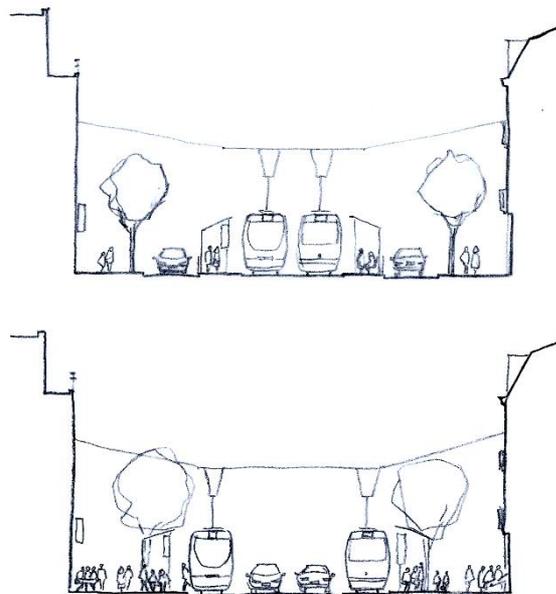


Fig. 3.2. Segregation of tram lanes from social life (picture above), and integration of tram lanes into social life (picture below).

3.5. Avoiding Physical Barriers and Waste Land (Handbook, pp. 22-23)

« Existing infrastructures

Where existing infrastructures create discontinuities, new projects should aim at overcoming infrastructure barriers with new safe connections. »

It would be interesting to add that if the barrier and the interrupted urban fabric are on the same

topographical levels, the more continuous and comfortable connection and the less hard walk and trip for pedestrians and bikers is, a priori, the underpass and not the bridge because of the technical constraints of crossing. Moreover, the design of underpass increases the level of inter-visibility if it is conceived on the basis of the principle of a move at continuous sight.

The suggestion for a revised subsection would be the following:

« Existing infrastructures

Where existing infrastructures create discontinuities, new projects should aim at overcoming infrastructure barriers with new safe connections. If the barrier and the interrupted urban fabric are on the same topographical levels, it is preferable to plan and design a spacious and naturally illuminated underpass instead of a bridge which is, a priori, harder and more insecure for pedestrians and bikers. » (Fig. 3.3.)



Figure 3.3. Spacious and naturally illuminated underpass Sievekingplatz in Hamburg, Germany (photo by P. Vanderstraeten).

3.6. Continuity of Urban Fabric (Handbook, pp. 26-27)

« Continuity with the existing streets and pedestrian routes

The design of a new development should not interrupt the existing pattern of streets and movements, but rather assure connections and continuous flows, to enhance vitality, and consequently spontaneous surveillance... »

It is relevant to mention explicitly here the tool 'Space syntax' conceived by Bill Hillier and Julienne Hanson (1989) and their lessons based notably on the distinction between segregated and integrated public spaces. Space syntax aims at the coherence and the balance of an urban network and allows to anticipate the potential of pedestrian flow and consequently the urban security and

feeling of security (see "Space syntax theory" in Working group 4 report). Furthermore, there are some interesting researches about the permeability/connectivity/porosity of urban fabrics which try to determine this quality of continuity by measuring inside an urban area from a given central point the rate between the real distance for pedestrians and the distance as the crow flies. These approaches join one of the Jane Jacobs (1992) principle of urban vitality, planning 'short blocks' (see supra). Also, more recently in France, David Mangin (2004) developed the concept of 'ville passante' .

The suggestion for a revised subsection would be the following:

« Continuity with the existing streets and pedestrian routes

The design of a new development should not interrupt the existing pattern of streets and movements, but rather assure connections and continuous flows, to enhance vitality, and consequently spontaneous surveillance. In order to make legible and therefore safe the pattern of streets, be careful to the right hierarchical connections...»

3.7. Location of Activities (Handbook, pp. 28-29)

« Sufficient activities to provide spontaneous surveillance

A project for regenerating an existing area or a new development should envisage enough activities to generate spontaneous surveillance on as many streets and public spaces as possible.

To provide safety one should avoid concentrating activities in a single place because this would produce a small vital precinct but would reduce vitality to the remaining urban fabric. Instead, in order to provide an extended control of urban spaces, activities should be spread along main routes or located at street corners... »

This recommendation corresponds to a dense city mainly consisting of apartment blocks where there are enough clients to make viable a lot of local shops, services and public facilities. In cities where the average urban fabric consists of house blocks, these local activities are logically concentrated in the same area, the centre of the neighbourhood, to facilitate the accessibility for the inhabitants and to produce the best urban externalities. For the occasional activities, these inhabitants go generally to the city centre or to the shopping or leisure malls. Therefore, the advantage in security produced by activities spread on all the streets, located on the ground floor in close relation with the public space, must be substituted with other measures linked to the domestic nature of the urban ambiances as porches, stoops, front gardens, balconies, all architectural layouts of houses where the inhabitants can stay in-between their home and the public space and provide effective natural surveillance.

The suggestion for a revised subsection would be the following:

« Sufficient activities to provide spontaneous surveillance

A project for regenerating an existing area or a new development should envisage enough activities to generate spontaneous surveillance on as many streets and public spaces as possible. To provide safety in cities mainly consisting of apartment blocks one should avoid concentrating activities in a single place because this would produce a small vital precinct but would reduce vitality to the remaining urban fabric. Instead, in order to provide an extended control of urban spaces, activities should be spread along main routes or located at street corners. Inversely, to provide safety in cities mainly consisting of house blocks one should develop vibrant neighbourhoods centres gathering local shops, services and public facilities whose public transport stops and also surrounding domestic neighbourhood with all architectural layouts of houses which allow the inhabitants to stay in-between their home and the public space. » (Fig. 3.4.)



Figure 3.4. Activities provide surveillance, Delft, Netherlands (photo by P. Vanderstraeten)

3.8. Visibility (Handbook, pp. 32-33)

« Bus stops, entrances to parking facilities and metro stations

Entrances to parking structures and metro stations as well as bus stops should be located in places well visible from the surroundings. This because access points to public transport and parking facilities are places that everybody needs to use; therefore they should not be unsafe places. Stops of public transport in each direction should be facing, so that persons waiting can see each others; shelters should be transparent and located far from entrapment spots. CCTV of metro stations and parking structures should cover also their entrances and surrounding spaces. »

Keeping visibility in mind must invite us to design carefully the sectional drawings of the public spaces until the underground in order to consider how to spread the natural surveillance of the ground into the first underground level; how to design a real low open public square in place of a introverted and detached mezzanine floor. The importance of the public frequentation of these underground places is well worth to optimize the visibility and also the legibility through the vertical spatial relations.

The suggestion for a revised subsection would be the following:

« Bus stops, entrances to parking facilities and metro stations

Entrances to parking structures and metro stations as well as bus stops should be located in places well visible from the surroundings. This because access points to public transport and parking facilities are places that everybody needs to use; therefore they should not be unsafe places. Stops of public transport in each direction should be facing, so that persons waiting can see each others; shelters should be transparent and located far from entrapment spots. CCTV of metro stations and parking structures should cover also their entrances and surrounding spaces.

Consider that mezzanine floors of metro stations are important public spaces and need to be activated and visible from the ground level. When it is possible, design them as they were completely integrated in the continuity of public spaces by maximizing the openings and the legibility of the space becoming in this way an indivisible whole (Fig. 3.5.). »

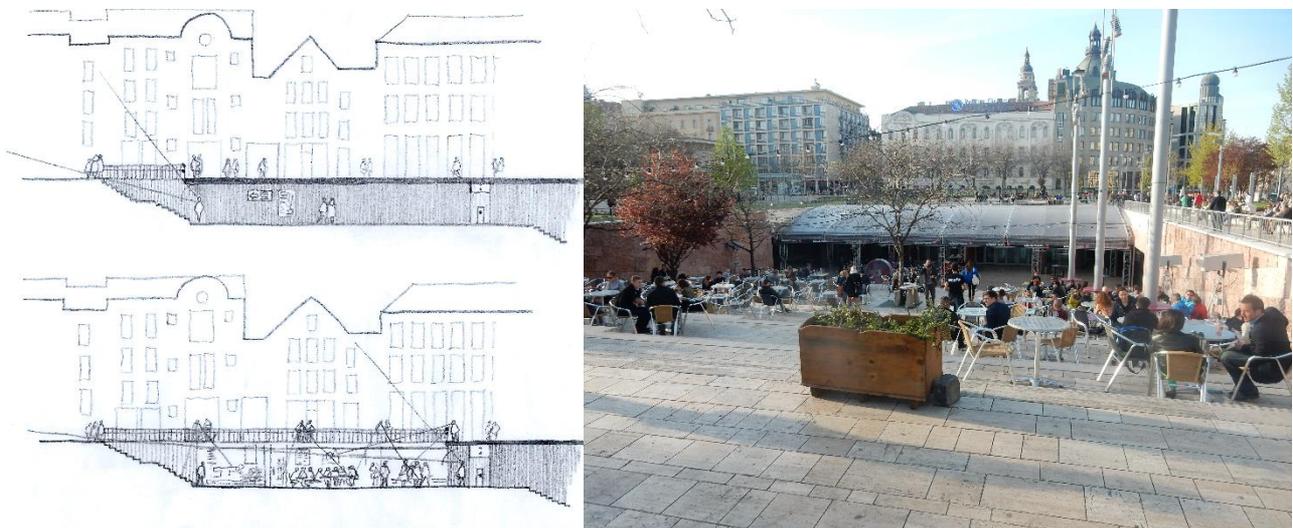


Figure 3.5. Mezzanine floor of metro station integrated into a public space, Budapest, Hungary (photo by Pierre Vanderstraeten)

The suggestion for a new subsection would be the following:

« Differentiation between frontside and backside

One should consider the general socio-spatial structure of the European housing between the frontside and the backside, between the public exposure and the deployment of the privacy. Natural surveillance occurs from the frontside while privacy, needing visual protection, instructs the behaviours at the backside. A priori, a public space bordered by backsides doesn' t benefit from

natural surveillance (Fig. 3.6.) »

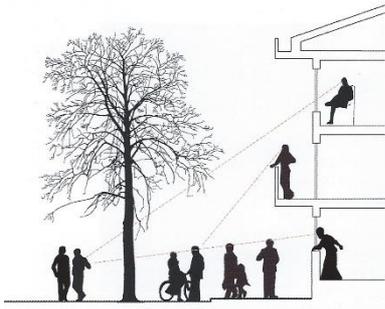


Figure 3.6. Visibility of the public space (left). Inter-visibility between people, doors, windows (right).

4. "Our Bus?!"

Sándor jr. Erdősi, György Alföldi, Peter Bach, Gergely Kukucska, Monika Velencei (Hungary)

4.1. Why the Line 99?

The line 99 is the famous, notorious bus line of the eighth district, with many annoying, frightening or even entertaining stories told by the passengers. The route goes along Magdolna quarter and Orczy quarter, and the happenings both in the bus stops and on the bus give us a mirror on the social issues and conflicts of each parts of the district. However, the utilization of the line is significantly high, since it's a widely known fact that most of the passengers use the line as a subway replacement, avoiding the costs of the tickets. After all, cutting the tickets is not only about the question of willingness, but of affordability of paying. According to the experiences of social workers, their jobseeking clients consider the accessibility of a workplace with no costs as one of the most important aspect.

Disregarding the affordability and the willingness of paying, we had two aims in our experimental project: firstly to find out whether traveling on the line 99 is unsafe indeed, and secondly to improve the safety and sense of safety of the passengers by the means of social and urban rehabilitation.

4.2. Only in Budapest?

The problems of the means and stations of public transport are globally known. The major of London made the public transport free for under 16 year olds in 2005. As the consequence of the measurement, the number of violent and antisocial behaviours committed by young people has increased significantly on the buses. That is why a member of the British parliament has compared the back part of the platform of some buses to "Beirut, a military zone of no law" (Moore, 2012). The lines going through urban crisis zones are especially affected by the antisocial behaviours, crimes that are disturbing or threatening the passengers, drivers and staff. Researches confirm that the number of criminal acts is also higher in territories with higher crime rate (Pearlstein -Wachs, 1982).

It is a general observation that the joint implementation of integrated means of law enforcement, social and communication, conflict management can decrease the number of criminal and violent acts. In the interest of handling the case in London, a "code of conduct" was developed by experts, and if someone violates the rules, their discount of free travel will be withdrawn. The experts had a special task of contacting frequently with the local actors, young people and the groups of perpetrators. The English bus drivers have a special training which deals with the acts of young people and antisocial phenomena in close details (A problem-oriented policing approach..., 2008). The public transport company of Los Angeles and the local police employed plain-clothes policemen – besides uniformed police officers – who provided help for the trained bus drivers, the so-called bus-police officers on the buses (Pearlstein -Wachs, 1982).

One Hungarian example of the simultaneous development of the public transport and public safety was the development of the night line network in Pécs. The “Party Buses” which were to help the people to get home at nights in Pécs were launched initialized and organized by INDIT Foundation, at the beginning by renting the last garage lines of Tüke Busz Ltd. The first party lines with security staff were financed by the nightclubs, because the frequency, the route and the timetable of the “official” night lines could not enable the secure way for the young people to get home. The professional development of the route and the timetable was done by a traffic engineer of Centre for Budapest Transport (BKK), and by the fellow workers from the Association for the Public Transport of Pécs and its Region (PTKE) and from Tüke Busz Ltd, and the municipality of the city launched the whole night bus network in the summer of 2013 – presumably as an effect of the tragic crimes in the city⁸.

The concrete idea of the pilot project of the bus line 99 came up in a French workshop in Saint Étienne. Vandalism and different kinds of antisocial behaviours frequently took place on this bus line heading into the deprived neighbourhood of the city. After a training of the project, on their days off, bus drivers were talking with the young people living in the area, and so with the perpetrators as well. As a consequence of the project, the vandalism and deviance has decreased on the buses and in the bus stops of the line.

Is it really that dangerous? - experiences of the research

The researches took place in multiple stages in the period between 2013 and 2015, with a purpose of investigating how much the information coming from the media or from public speaking represent the real situation, and of getting a more exact view on the situation according to the real experiences of the passengers.

Before the researches, we organized an expert team, who had the task to show a direction to the researches with the local experiences and to evaluate the findings from time to time. The “expert team of the bus 99” consisted of social workers of the area, experts dealing with crime, crime prevention and community development, university professors, fellow workers of BKK and Budapest Transport Privately Held Corporation (BKV), representors of NGO-s of the quarter and the experts of Rév8 Ltd.

Preparatory field research in 2013

In the summer of 2013, at one of the workshops of the Department of Urban Planning and Design Faculty of Architecture in Budapest University of Technology and Economics (BME), nine students went for a preparatory field research on the bus line 99. They had to make a participatory

⁸ Based on the interview with Attila Hegedus, who is the project coordinator of INDIT Foundation in Pécs.

observation research as passengers, and to record their experiences. Perhaps one of their observations were the ones related to the passengers' use of space and to the children:

“The following illustration (Fig. 4.1.) demonstrates how particular groups of passengers are located in different types of buses. It is clearly seen that there are no significant distinctions or characteristics of the usage during the day. The groups are mixed almost equally, mostly the more vulnerable ones (e.g. young or older women) are lying closer against the door. However, the situation changes in the evening. Then each groups (vulnerable, average passengers and threatening passengers) are more separated and they find their own place on the bus.

It is mostly remarkable in case of the IK260 buses, where the threatening passengers are hanging around in the back, while the vulnerable passengers are tending to stay closer to the bus driver – probably because of the transparency of this type of bus. It is all obvious, since the bus driver is the only official person who has any authority, but it is still a question whether this authority is real or just assigned.” ... “The issue of turfs is not an unknown phenomena, which appears on the means of public transport as well as in public spaces. Although it is much more striking compared to the streets due to the tightness of the small place. Each “territory reserving” group can rearrange the densification of a bus. The passengers draw apart even at the cost of staying more crowded.

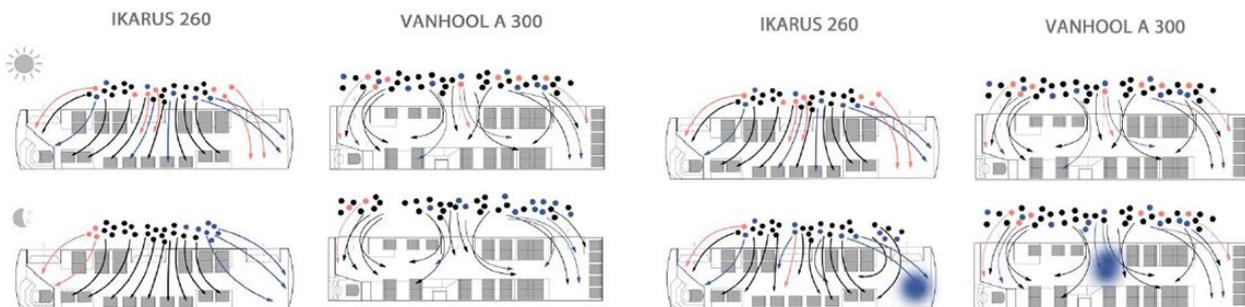


Figure 4.1. Territories inside the buses, Source: Preparatory field research, 2013

In case of the IK260 buses these territories are formed mainly in the back of the bus, but in the cases of VHA300 they can appear by the door in the middle as well.” (Reinitz, 2013)

“During our research, it was an exceptionally positive experience to meet with the passengers’ attitudes towards children. Regardless of age, gender or ethnicity, all passengers were much more tolerant with children and their adult company. Another positive experience was that the children became the talking point between passengers. A small talk of these can already resolve some tension.” (Reinitz, 2013)

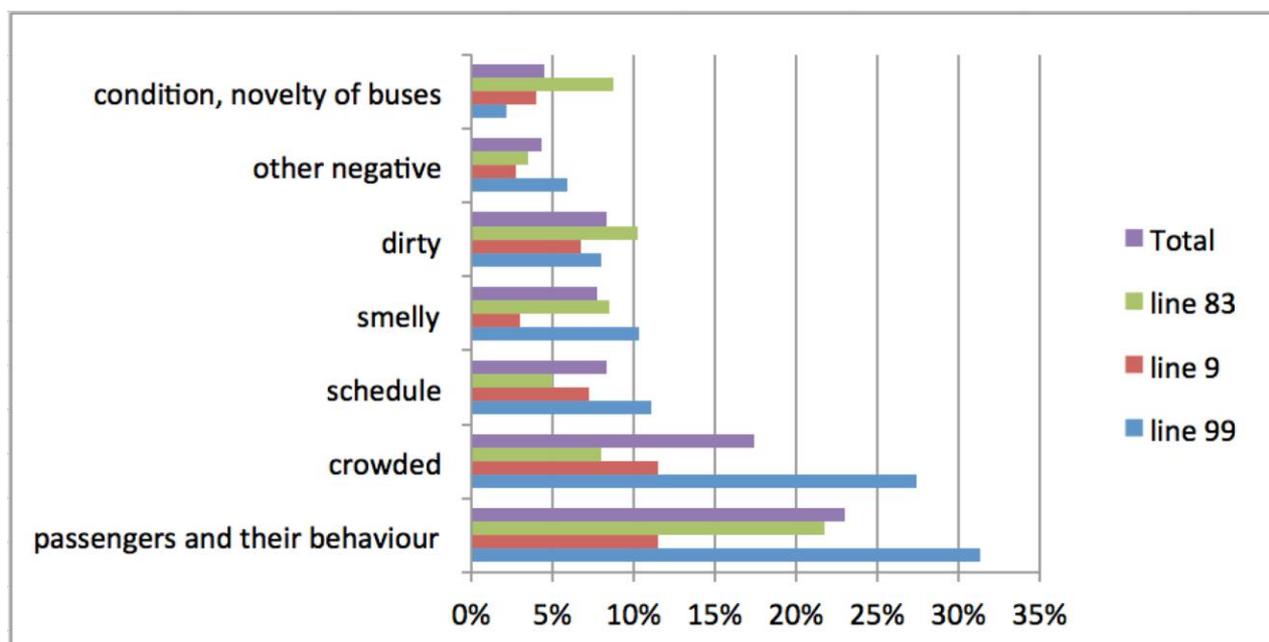
Empirical research in 2014

In the autumn of 2014, we made an empirical research with 1400 waiting people in the bus stops of line 9, 83 and 99⁹.

The surveys were complemented with focus group discussions and interviews with the participation of bus drivers, ticket controllers, supervisors of the Public Space Supervision Authority and young people¹⁰.

According to the results, the bus line 99 was used by people with education of maximum eight grades, and by people with roma background¹¹ in higher proportion, than the other two lines.

Amongst the passengers of the three lines, those people who were waiting for the bus 99 mentioned the least positive points and the most negative points related to the line in question. They rated the route positively, but had negative comments on some “deviant” types of passengers, their behavior and the crowdedness of the buses. According to the experiences of bus drivers, the critical period starts from afternoon until night, especially on the weekends. As they put it into words, the members of the “deviant” groups realize actually the opposite of the “Terms and Conditions of Travelling” with their behavior (Fig. 4.2.)



¹⁰The surveys and the interviews were carried out by the fellow workers of the Monitor Social Research and Methodology Center.

¹¹The classification of the ethnicity was made by the questioners.

Figure 4.2. The relative frequencies of categories of answers in response to the question on 'I dislike travelling on bus No. ... because ...', in percent of respondents, Source: 99 Bus Survey, 2014

Regarding the respondents waiting for the bus, we were investigating (1) their trust in fellow passengers, their cohesion, and (2) the function of informal social control related to the public safety, and the interventional intention for safety with the mean of evaluating of six statements¹² (Sutherland-Brunton-Smith-Jackson, 2013). According to our data, people waiting for the bus 99 had significantly more negative opinion in dimensions of trust, cohesion, informal control and interventional intention (Fig. 4.3., 4.4.), than the passengers of the other two buses.

20% of the waiting passengers of the line 99 are afraid to get on the bus without company after dark, 10% are still afraid during the day. Every tenth passenger of the line 99 experienced disturbing or threatening behavior in the preceding four weeks (10%). The frequency of similar actions were higher on the trolleybus number 83, which goes more frequently through the eighth district (15%).

The year before the research, 8% of the questioned persons became victims of a crime on any mean of public transport, or in stops in Budapest. The victims suffered more frequently of crimes such as theft, pocket theft (5%), robbery including necklace, or bag rip-off (1%), and attack, abuse (1%). Interestingly, amongst the three observed lines, the smallest number of crime was mentioned related to the line 99.

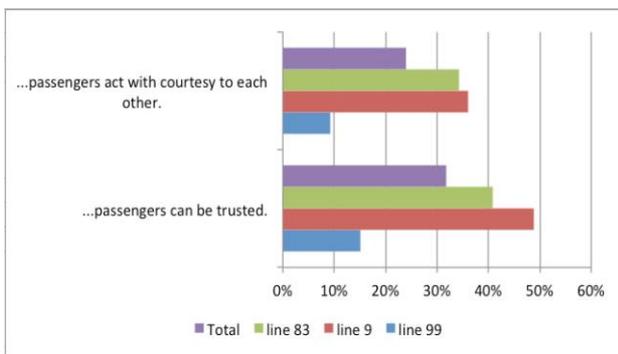


Figure 4.3. Cohesion/trust – Do you agree with the following item: On the bus No.? Source: 99 Bus Survey, 2014

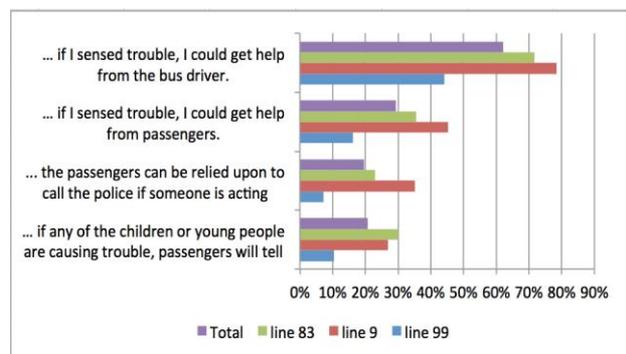


Figure 4.4. Informal social control/willingness to intervention - Do you agree with the following item: On the bus No.? Source: 99 Bus Survey, 2014

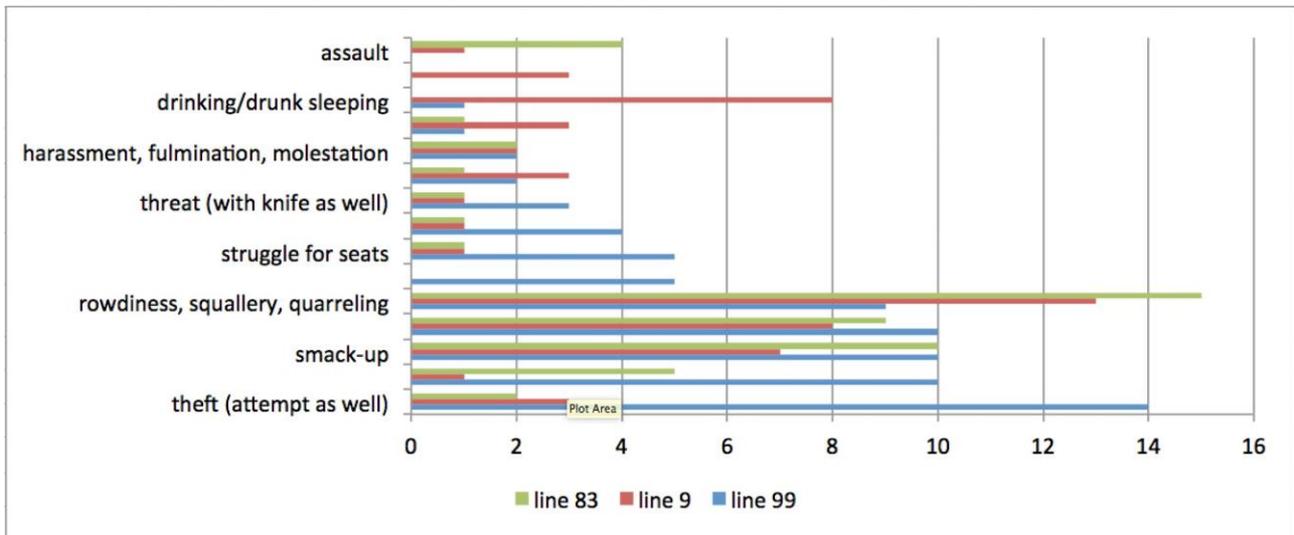
Most insulted respondents became victims on the tram 4-6, and 28. 43% of the victims made a police report in connection with crimes on the public transport. A quarter of the waiting passengers of the line 99 thought that there are such stops on the line where they would be afraid to wait for

¹²The concept "collective efficacy" is analysed with attitude questions in the data records of measuring crime, becoming victim, among other things in the Metropolitan Police Public Attitudes Survey (METPAS) of London as well. The survey of METPAS has been carried out by the Mayor's Office for Policing and Crime since 1983. The attitude questions aiming at collective efficacy were taken from this source (Sutherland-Brunton-Smith-Jackson, 2013).

the bus after dark. Three of the four stops mentioned as the most “dangerous” stops are located in the Magdolna quarter.

The results of the two researches showed that the line 99 – and the other two line, the 83 and 9 as well – has the same significant characteristics that the quarter also has (Fig. 4.5.).

Figure 4.5. What type of disturbing or threatening behaviour playing against you or other passengers have you experienced for last



four weeks on the bus No. ... or at stops of it, in percent of answers (n/respondents=142) Source: 99 Bus Survey, 2014

The essential means of transport are characterized by people of various, different social, economic and cultural origin and life situations, and their conflicts appear in a concentrated way in the stops, and on the buses. Eventually, we focused our attention to three main groups: the bus drivers, the passengers, and the buses / bus stops.

4.3. What Can We Do? - Our Goals and Methods

Simultaneously with the researches, we started to react to the already detected situations. Both from the discussions in the expert groups, and from the preparatory researches, we perceived that the passengers and the local residents require the presence of a stronger security.

As the first measurement of the project, the neighborhood police officers of the Magdolna quarter started to travel in their office time on the bus 99 through the eighth district. It is thanked most probably for them and for the patrolling of the Operational Police (Készenléti Rendőrség), that the number of the crimes committed on the line 99 in the eighth district has fallen after 2013 (Fig. 4.6.).

The basic primary and undertaken goal of our project was to increase the safety and the sense of safety of the passengers of the line 99. For the sake of the cause, we created the series of programs with the evaluation of the researches and international experiences, which we accomplished in 2015.

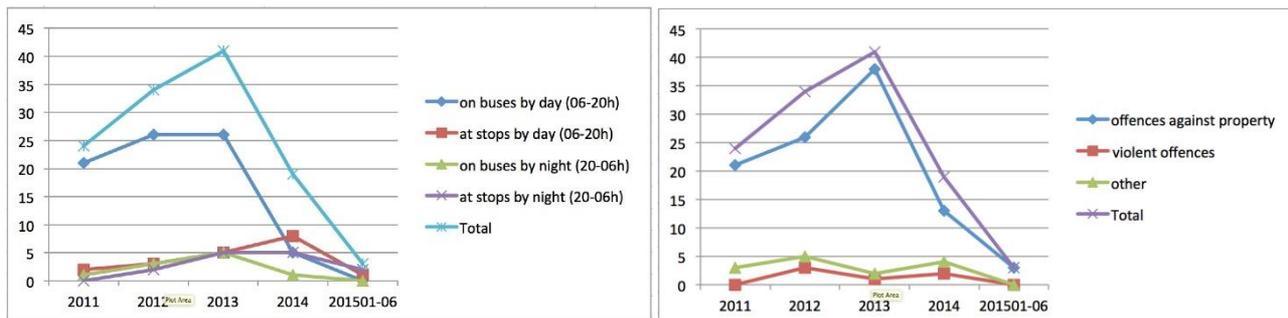


Figure 4.6. The number of investigations launched connected with bus line 99 in District VIII. between 2011 and the first half of 2015
Source: Robotzsaru Neo, BRFK VIII. ker. Rkp., based on Tamás Perjési's study, Perjési, 2015)

Besides the policing measurements, we developed basically means of social crime prevention, community building and urban planning, because we believed that our means – the community events, the social work on the street, and the modern bus stops created to the local conditions – can draw the attention of the users to the fact that despite of its drawbacks, the line 99 is valuable, since it serves them.

Raising awareness, and forming the culture of behavior were our key objectives that led us to provide occasions for the young passengers and bus drivers to meet informally. We tried to transmit such communicational modes to the bus drivers that make them solve the conflicts even with passengers who are difficult to treat. Our bravest undertaking was the social work on the bus 99, which started from the assumption that not only the policing means, but nice words and assistance can also provide security on a bus line passing through a social crisis zone.

The projects of "Ours"

"99" theater pedagogy performance in the classroom – for local children and youth.

One of the goals of the project was to shape the view, the culture of behavior and to improve conflict solving skills of the traveling public. We tried to reach the children and the youth with a classroom performance that implements an interactive, theater pedagogy methodology. The performance created by people from Kolibri Theater had the purpose to transmit the conflicts deriving from the superficial encounters of subcultures, related to the bus 99 in an emotional, sensible, pedagogical way, raising questions and awareness. The performance involving the children as passengers was staged in the summer of 2015 in the Kesztyűgyár Community House and in autumn in an elementary school. The presentation of the "troubles" on the bus went so well at the first time that the workers of Kesztyűgyár were running into the auditorium, frightened of the sound of the "trouble" between the children. By the end of the performance, the children, the theater pedagogues and the actors found and played similarly "real" and positive solutions.

Our bus drivers – communication and conflict solving training for bus drivers.

For all bus drivers, as for all workers dealing with people need professional help and training to find smooth solutions for communication situations or for any accidentally appearing conflicts in their work. It is especially true for the bus drivers working in the extraordinary circumstances of the line 99.

The lecturers of two and a half day long training – communication and conflict solving experts, social workers dealing with young people in the Magdolna quarter, the neighborhood police of the quarter – were teaching the drivers the power of the words and persuasion and its techniques. The tactical dispatch training of the police prepared the bus drivers for the appropriate handling of the most difficult, physically conflicting situations. With the help of the actors from Káva Association, the participants could present the familiar situations and they could find lifelike and peaceful solutions in an improvised way together with the expert trainers.

In the end, the Káva Association collected the typical conflict situations of the drivers' experiences and made a short movie adaptation. The traveling public had a chance to watch the movie on a residential event on the 8th of August, experts and a quiz also helped in its interpretation (Fig. 4.7.).

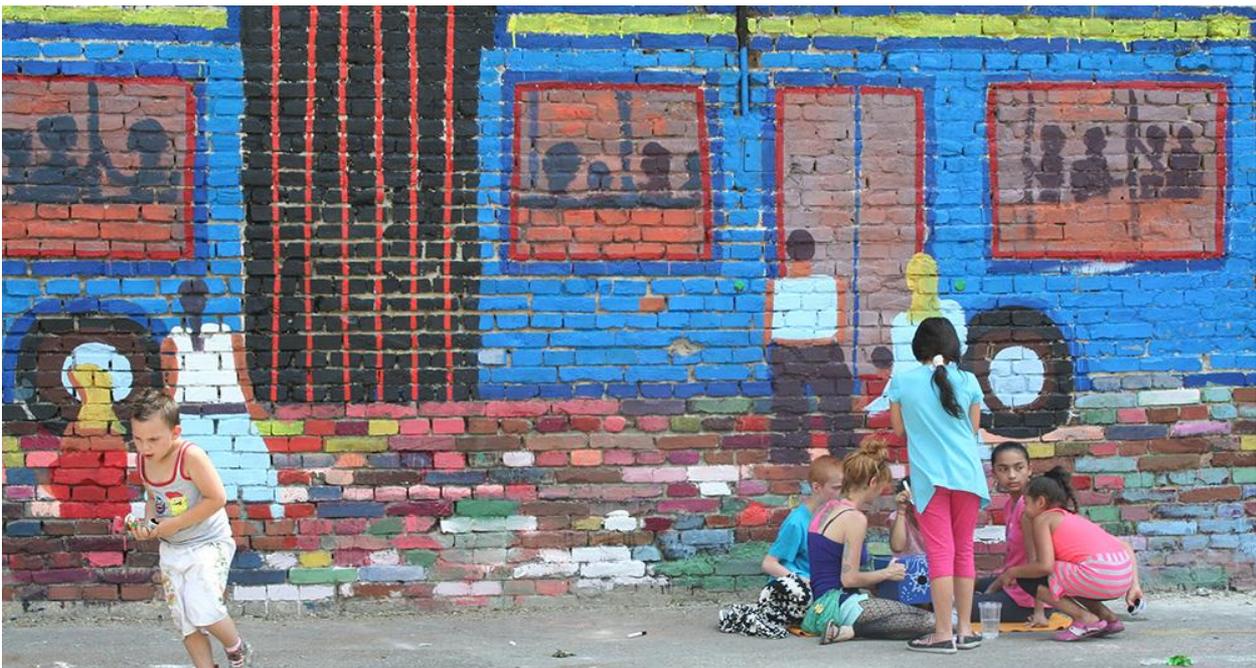


Figure 4.7. Our Bus events 2015 Source: Rév8, 2015

Our bus – residential events near the bus stop at Teleki Square (17th July, 8th August and 10th October 2015). Our residential events “promoting” the bus line of the quarter were organized in the summer of 2015 (Fig. 4.8.). Before the events, the MicroMagdolna Group – two post-graduate students of the Doctoral School of Architecture at the Faculty of Architecture of BME – were going with architecture students to the popular places of Magdolna quarter amongst youth and gave drawing workshops to gather information on the experiences and wishes about the children's dream bus in place of the current bus 99. Rozi Csámpai, the strongly engaged art teacher of Kesztyűgyár and university students helped the young people to create their drawings and the wall of

“tolerance” on the venue of community meetings. The gigantic painting of the bus 99 created by the children got exposed as a mural on the corner of Teleki Square since then (Fig. 4.7.).



Figure 4.8. Our Bus events 2015 Source: Rév8, 2015

The teachers and students of the Department of Urban Planning and Design Urban Future Laboratory in BME created a real size model of a modern, interesting bus stop of the line 99 (Fig. 4.8.). On the event, the children and the habitants used the bus stop, made decoration and put messages on it. During the events, the Ikarus 260 bus standing on the land and the drivers were mostly popular amongst both the adults and children.

Various events took place on the bus, but what the children enjoyed the most, was sitting behind the steering wheel and talking with the drivers as fellows about what they see and feel in the driver's seat. These informal conversations brought the drivers and the passenger children and adults together.



Figure 4.9. Drawings made by the children 2015 Source: Rév8, 2015

There were other programs on the buses besides presenting and trying them. The bus was put in center by all the “obstacle-race” , the stations of the “99-contest” the exposition of children drawings (Fig. 4.9.), and the crochet decorations. The quiz of the history of 100 years of bus

transport, or the contest reviewing the code of travel, discounts of transport had the aim to get acquainted better with the bus transport. The slam poetry that aimed at the recognition of the traveling public and the theater play about the line 99 played similar importance.

All the programs – with the bouncy castle, and the paper bus-model workshop – had the same goal: to get the local people closer to the bus line which serves the needs of the habitants of the eighth district.

Our passengers – social workers on the buses.

In the autumn of 2015 experienced social workers helped the passengers on the bus 99 through the eighth district. Our colleagues with a blue cap with the number 99 were informing the interested passengers about the code of travel, but they also improved the security of the buses and bus stops and the sense of security of passengers by providing (social) help and conflict management.

Within the project which was realized between the 14th September and 14th October, we did not deal with people cutting the tickets, or antisocial behaviors that would require policing solution, we applied only the means of communication and positive examples.

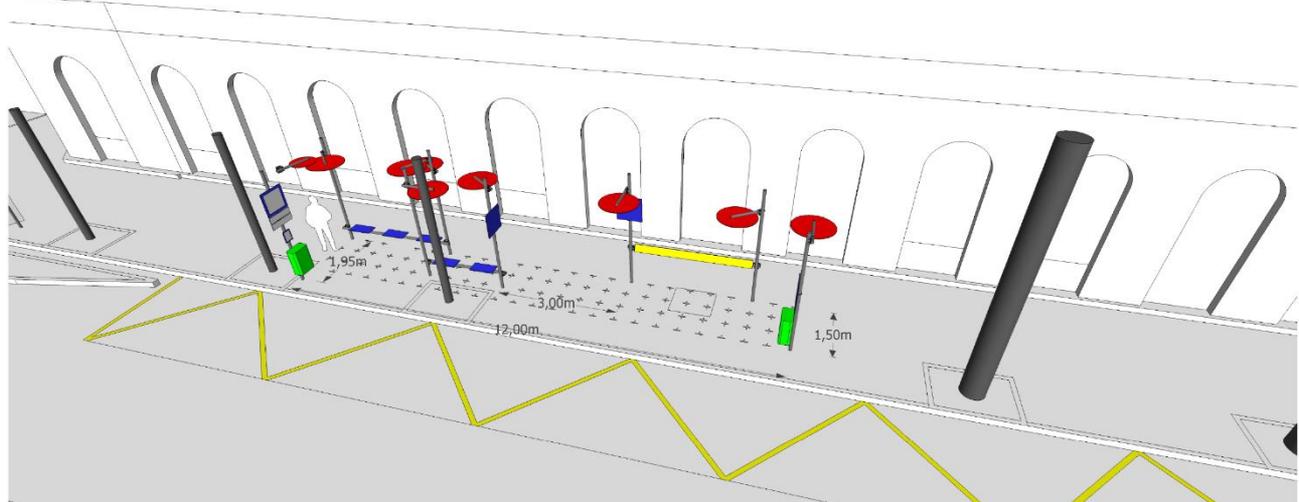
In order to shape the culture of behavior, we wanted to introduce such social work that the actual traveling public will accept and support. Sometimes our colleagues gave reward for the cooperative passengers (caps, key-holders, earphones, nylon raincoats). According to the feedbacks on the work of our colleagues, the passengers got to know them, the majority welcomed and acknowledged their work, and usually even the passengers who are “difficult to treat” also accepted and performed their request.

Our bus stops – experimental bus stops on Teleki Square and Mátyás Square.

On the two summer events, the local children occupied the bus stop models made for this purpose. The teachers and students of the Department of Urban Planning and Design Urban Future Laboratory in BME analyzed the bus stops in the quarter (Fig. 4.10, 4.11) and recorded the attitudes of the children.

At the evaluation of the bus stops in the Magdolna quarter, the planning team has recognized that they have to take many aspects – sources of conflicts, functional shortcomings, opportunities for community building and the possible means - into consideration during the design and realization in order to improve the sense of public security.

The stops in the quarter, especially the stops at Teleki Square are characterized by scarce conditions of building lines and narrow sidewalks – in some cases there are only 1.5 meter wide sidewalks between the buildings and the road. The stop is signed only by a steel tubing and a metal board on it. Therefore, the waiting place are not able to provide even a minimal sense of comfort.



4.10. Our Bus stops, analysis 2015 Source: Rév8 / Péter Bach, 2015

As a consequence, the most important principles of the planning the renewal became the designation of the exact location, the transparent structure that confirms the sense of security. In sake of the long-term sustainability, the endurance against strains and the security of everyday travel, the new functions got integrated with the implementation of the utility system used by BKK.

These new functions are the seats or bottom support, the minimal protection against sun or rain, or the hangers for sacs. The stations have got new trash cans. The collected children drawings also got taken into account at the designing of the information system. The plans were coordinated by BKK and the support of experts enabled two-two stops to get built.



Figure 4.11. Bus stop plan 2015 Source: Rév8 / Péter Bach, Gergely Kukucska, 2015

In the narrow stops, on the small sidewalks there are little opportunities to set up “conventional” bus stops, therefore they will be transformed with the application of elements of the system, which is already present, and commonly known and recognized for everyone (Fig. 4.12).



Figure 4.12. Bus stops 2015 Source: Rév8 / Péter Bach 2015

With the drawings made by the children on the summer events, and with the bus stops built on the scene, the planning team aspired to involve the local people with the interest of having the individual bus stops to strengthen the identity and a sense of belonging of the habitants.

The design task was to put the four bus stops of the programme into a new context, in order to draw attention to them and by improving their public safety distinguishing them from the other common stops used around the city, while expressing the initial objectives addressed to the locals.

The straight-forward strategies and tactics of contemporary design indicate, that by re-interpreting the objects filling up the peripheries of our perception, new playful situations can be established,

and at the same time the subtle permission processes of public edifices can be loosened too. To do so, the design team opted to use a simple existing element – the road sign - of the stops for that purpose and developed this element as a system. The use of the standard posts and road sign plates combined with the general shackles provided numerous possibilities for combination, a relative simple way of installation and flexibility for possible future conversions.

As a result of the special spatial attributes of the site, the implementation of a traditional and usual bus stop - that would have provided all-round protection - was not possible. Besides providing the basic functions of use (safe getting on and off the buses, seating / leaning, information signs, waste management, shading and cover, illumination) the aim was to create a playful micro-environment, that attracts the attention of people while waiting and that is able to divert the conflicts – at least now one can sit down, lean against something, or wait for the bus at a marked and designated place and put down the bag when coming from the market. The applied system of the road signs consists of set of tools commonly used in public spaces – the easily identifiable symbols of the traffic and road signs, in terms of environmental psychology, are quite effective instruments of prohibition, control and information at a given street corner – e.g. that one can get on the bus there – by using a system of symbols that is conventional and recognisable for everyone.

The aim of the designers was - by the use and transformation of the sign system mentioned – to create a lively and cheerful environment filled with the drawings of local children. To create a bus stop where children and their thoughts can play an important role in forming of a human environment and also in the evolvement of the experience and the culture of “waiting” – doing this with a bit of humour and without taking themselves more seriously than needed.

4.4. Conclusions

It' s an international characteristic that high fares cause a problem to members of the group with the lowest income. You can travel without the slightest fear of being caught on the buses going through the slums without a ticket, however, even passengers who could actually afford it don' t pay so they have a low willingness to pay. The methodology of the research conducted to unveil the characteristics of the route of Bus 99 used several tools:

- participants' observation,
- personal interviews in bus stops,
- interviews and discussions with the focus group.

The realization of the project used the complex approach of international best practices:

- via the use of neighbourhood watch and patrols of the Operational Police who checked regularly and accidentally on the hotspot of local public transport and of criminal activity reduced the number of crimes reported.

- ↘ The “Bus 99- educational performance in the classroom” aiming at children and youngsters living in the area is still on at the theatre.
- ↘ According to our survey, the passengers expect the bus driver to resolve the conflict on the buses. The trainings for better communication skills, conflict resolution, sensitivity awareness and physical training to combat physical assault were much more welcome/popular than expected. Bus drivers found the initiative, the topics and the realisation highly useful.
- ↘ Social workers working on the buses at the most crucial periods of time were able to resolve conflicts successfully that carried the potential of physical danger. According to passengers’ and bus drivers’ feedback the safety of this route has increased a great deal. The model introduced for one month is effective on its own but also can be used on the long run and as a basis for evidence based analysis.
- ↘ The stimulus threshold of the media was only triggered by four experimental bus stops. Although the new bus stops were disliked by both the leaders of the local council and the members of the local opposition, they still soon found themselves in the local political arena. The functionality, the aesthetics and the realization of the bus stops became the subject of the complex confrontation among laymen, professionals, designers, some groups of the opposition and the management of the council. The opinion of the users have not been asked but we hope this matter will be dealt with promptly.

The project carried out in Józsefváros has been a unique experiment in Hungary that was carried out with the integrated tools of urban regeneration and with the involvement of local partners to prove that handling the conflicts arising on routes through the slums of Budapest can be resolved leaving out authorities. By looking through the results of the project therefore we strongly believe that the objective and subjective safety of public transportation routes going through the deprived urban areas can be enhanced by the complex and integrated attitude implemented in the project. Reviewing project experiences might not be assumption without base that our complex/integrated approach can be applied to increase in a sustainable way both objective and subjective safety of the public transport lines even in deprived areas of the cities.

5. Safety at Bus Stops

Chiara Simonetti (Italy)

5.1. Introduction

This study is a part of a wider operation due by “Direzione progetto periferie” which wanted to define new methodologies to approach the requalification actions on the urban outskirts.

In order to coordinate the different approaches and the different points of view, the Transport Company (ATM - Azienda Trasporti Milanese), the Municipality and the Urban Quality and Safety Lab (now LabQUS) worked together in a round table where each contribute with its specific knowledge and competences.

The study of the bus stops safety has been done in an area of Milan with the aim to define criteria for designing, renovating and modifying the bus stops. These criteria should be generalizable as much as possible in order to be applied on the entire urban public transport net.

The study area, due by its position and characteristics, is halfway between the city center and the outskirt of the city, and has an intermediate level of safety problems. Because of this, it is a good study field to build and test some “prevention of insecurity” policies, which can later be actuated on several potentially problematic parts of the city.

The study has been done through these phases:

- ↘ 1° phase - evaluation of the safety at the bus stop, due through direct surveys and collecting data from ATM.
- ↘ 2° phase - elaboration of safety guidelines to be applied in the outskirt areas: due by a comparative study of European and North-American countries cases and a roundtable between all the involved actors (Municipality, ATM, Local Police, Labsic etc.).

5.2. Research Methods

The study method: the “indicators”

The first tool which has been used to study and describe the safety of the area are the “indicators” (which is a study method built by the LabQUS: see COST-TU1203 meeting in Milan, June 24th – 26th 2013, and the “Milan Booklet”).

The “indicators” are those factors that contribute to create a safe or unsafe urban environment in both real and perceived terms.

This study took into account these indicators:

- ↘ landuse
- ↘ structure of the buildings, the waste lands and the road system

The final result of this phase has been a safety map of the area, which has been done for both day and night time.

Safety at the bus stops

The safety of bus stops comes from both the safety in the area and the specific characteristics/conditions of the stops.

After a survey of the safety of the whole area, the LabQUS did specific surveys on the bus stops. These surveys have been done at the different time of the day and they analyzed:

- ↘ flows of users – interchange flows between different bus lines;
- ↘ origin/destination point of the different pedestrian movements related to the bus stop;
- ↘ specific facts about the stop;
- ↘ conflicts between public transport vehicles and private vehicles (standing or parking);
- ↘ visibility condition for people waiting the public transport means.

Fermata: Giambellino dei Sanniti Intensità d'uso: media
 cod: x14 07 Sic.zza ambientale diurna: medio-scarso
 Linea: 14 direz: Cim. Maggiore Sic.zza ambientale nott.: pessima
 Via Giambellino



AMBIENTE

- Strada a doppia carreggiata con ampio spartitraffico centrale, non alberato, con sede tranviaria e fermate sullo spartitraffico. Livello di traffico medio.
- L'attraversamento pedonale verso lo spartitraffico richiede attenzione a causa del traffico.
- Marciapiedi di dimensioni medie con movimento pedonale medio-basso.
- L'affaccio su strada dell'edificio è una recinzione con edifici arretrati e ingresso con portineria. Sul lato opposto della strada affaccio diretto.
- Il rapporto col lato opposto della strada è abbastanza diretto in termini di visuale, ma è ostacolato dalla presenza dei binari.
- Il livello di illuminazione notturna è medio.

ATTIVITA'

- Nessuna attività commerciale in corrispondenza della fermata; sul lato opposto della strada due negozi.
- Nessuna attività culturale o socio-ricreativa nelle vicinanze.

ELEMENTI DI DISAGIO / INSIKUREZZA

- Prospiciente alla fermata c'è il quartiere ALER, molto degradato, fonte di numerosi problemi, con occupazioni abusive, piccola delinquenza, bande di giovani.
- In passato prostituzione, recentemente spostatasi.
- La fermata è tra quelle considerate poco sicure da conduttori e cittadini, per la scarsa frequentazione del luogo.

FERMATA

- La fermata è stata recentemente attrezzata con banchina sopraelevata e barriera di sicurezza interamente contenute nello spartitraffico.
 - Il movimento passeggeri è medio.
 - La fermata ha una sicurezza ambientale medio-bassa nelle ore diurne e pessima nelle ore serali e notturne.
- Stante l'avanzato degrado del prospiciente quartiere ALER nell'intervento di riqualificazione si propone di inserire un fronte commerciale, pubblici esercizi aperti anche di sera e attività socio-ricreative, attualmente molto carenti.

Figure 5.2. Prepared maps for bus stops.

All the collected data and the results of these surveys have been organized and structured on maps and they built a map for every single bus stop (Fig. 5.2.), on these maps the following elements are indicated:

- detailed position of the stop;
- analyzed factors;
- considerations about people' s insecurity feelings;
- final evaluation about possible modification of the bus stop.

5.3. Strategies and Proposals to Improve Safety

Public space control strategies

The strategies to enhance safety in the public space are based on three kind of surveillance:

- spontaneous surveillance;
- semi-spontaneous surveillance;

- ↘ organized surveillance.

The spontaneous surveillance is strongly related to the vitality of the places, it is the “eye on the street” , provided by shops, kiosks, windows, activities, doormen, pedestrian flows, vehicles flows, public transport, taxi parking spots, and all the urban life elements that can provide help in the case of need.

The semi-spontaneous surveillance is made up by organized kind of surveillance based on natural surveillance methods (such as the famous “neighbourhood watch” and others kind of associations)

The organized surveillance is based on law enforcement agencies presence on the territory, police patrol, private police and CCTV technologies.

Strategies to improve safety at bus stops

This study identified some kind of actions directly related to the bus stops to be applied in order to improve the surveillance and, therefore, the safety:

Acting on spontaneous surveillance:

- ↘ moving the stops from desert spots without “eyes on the streets” to more “surveilled” spots;
- ↘ making the waiting places more visible;
- ↘ promoting communication campaigns in order to reassure citizens and users about their personal safety on the transport means and at the stops;
- ↘ implementing pricing policies intended to encourage people using public transport in morbida hours;
- ↘ encouraging kiosks and newspaper shops moving near the bus stops;
- ↘ extending the opening hours of the shops nearby the stops;
- ↘ improving lighting.

Acting on semi-spontaneous surveillance:

- ↘ equipping the drivers with technologies to report crimes or vandalism and photograph the perpetrators;
- ↘ providing reference people (such as mediators, ticket inspector...) on risky lines in offpick hours in order to discourage vandalism and crimes and reassure the transport users;
- ↘ cooperating with organized surveillance groups of citizens;
- ↘ organizing voluntary group of surveillance on public transport.

Acting on organized surveillance:

- ↘ placing CCTV at the riskiest bus stops;

- ↘ placing emergency calling disposal with direct connection to the headquarters;
- ↘ defining an intervention plan with the police;
- ↘ defining the surveillance path with the police.

Proposals – displacement of the bus stops

The basic aim of the bus stops displacement that the LabQUS proposed was to improve the natural surveillance on the stops. The proposed displacement was intended to have the stops:

- ↘ close to bars, restaurants and shops;
- ↘ as far as possible from waste land and unsurveilled green areas;
- ↘ right in front to each other;
- ↘ close to the street intersection in order to be visible from different directions and to have more escape ways in case of need;
- ↘ next to buildings directly facing the streets;
- ↘ next to the building entrances especially if they are surveilled;
- ↘ as far as possible from problematic areas (decay, drug dealing and other illegal activities).

5.4. Recommendations and Conclusions

From the case study to the general guide lines: locating the bus stops

Bars, restaurants, and commercial activities

To locate the bus stops near bars, restaurants, newspapers shops, cinemas, theaters etc. is generally a good choice because the presence of the activities clients improve natural surveillance on the bus stops and on the increase people waiting perception of security.

Building entrances

It is recommended to place the stops close to the buildings entrances and nearby the windows of the buildings directly facing the streets.

Green areas

It is preferable not to place the bus stops next to green areas because they generally are empty at night time and they may have poor surveillance.

If to place a bus stop close to a green area is necessary, then some precautions should be applied:

- ↘ the green elements near the stops shall not create blind spots;
- ↘ the whole surrounding area shall be well-lighted;
- ↘ the bus stop should be placed near the “dogs’ areas” because these areas are used at different times, even in the evening.

Waste lands, blind walls, cul de sac

Placing bus stops near this kind of places shall be always avoided.

Parking areas

Placing bus stops near big parking places is important because of the interchange function between private and public transport, but it can produce some security and perception of security problems, therefore it has to be evaluated case by case.

From the case study to the general guide lines: building and managing the bus stops

Visibility

The waiting area shall be organized in order to allow wide visibility on the surroundings. Therefore, elements like walls, bushes and others visual obstacles shall be avoided, and the heavy vehicles abusive parking shall be repressed.

Bus stop shelter

The shelter design and materials shall allow visibility from and to people waiting: the shelter has to be transparent enough to guarantee people waiting and pedestrians to see each other.

Lighting

The bus stop shall be lit enough to guarantee people waiting to recognize people coming to them. The lighting shall be well located in order to light up the waiting place and in the meanwhile to avoid the blinding effect (that we generally have looking from well-lighted spots to more dark surroundings).

Stop identification number

Each stop shall have an identification number well visible to the users, in order to quickly identify the stop in case of emergency calls or to report vandalism and other happenings.

Minimizing the waiting time

This can be achieved through a good communication of the bus time schedule which shall be easy-accessible and real time updated.

Concentrating the night time waiting points

Referring to large waiting areas and interchange nodes, the night time waiting points shall be as more concentrate as possible, in order to allow natural surveillance among users and to better manage other actions such as lighting, communication, information about the busses arrival time etc.

Emergency calls

Having at each bus stop an emergency call button to contact the police and the transport agency headquarter improves both security and perception of security.

CCTV

CCTV can be used in addition to other measures in order to improve security.

Conclusions

Public transport is strongly related to safety and perception of safety: in a safe environment people feel comfortable to use public transport and people using public transport contribute to make the urban environment more vital and safe, thanks to the presence of people and the spontaneous surveillance they give.

Because of this, the locations of bus stops are very important. On one hand, they can be "vulnerable elements" and it is important to carefully study their characteristics and locations in order to guarantee users' safety. On the other hand, they are a positive reference point to safety. Therefore it is important to approach this issue considering this "double face" of bus stops and treating them as both an element to be "surveilled" and a tool to improve safety.

6. Security in Public Spaces in Jerusalem with Emphasis on Mobility and Public Transport

Elad Persov, Mike Turner, Liel Ben Ami, Zev Drukman (Israel)

6.1. Introduction to the Jerusalem Public Transportation

Jerusalem is characterized by its expansion on a number of hills, including a small amount of radial axis lines that lead from the remote neighborhoods to the city centre (Fig. 6.1.).



Figure 6.1.. Aerial photo of the Jerusalem

Till 2011, the city's public transport system was based on buses and taxis alone when a modern electric Light Rail (LR) system began to operate its first line. This new addition brought a dramatic change in the urban planning of the city centre. Jerusalem's main street was transformed from a smoky jammed street into a pedestrian and environmental friendly zone (Fig. 6.2.).



Figure 6.2. Before and after the Light Rail system in Jaffa Street, Jerusalem, Israel (photos by M. Turner)

6.2. Research Methods

The research was conducted through a case-study methodology. The case-study started at a workshop conducted by the Bezalel Academy of Arts and Design, in May 20 – 22, 2015, as part of

the COST TU 1203 Action. The workshop focused on the new CPTED strategy for the recently built light rail system, and the changes in the CPTED strategy of the public bus network.

Participants in this workshop included COST experts from seven EU countries and five researchers from Bezalel faculty, together with high ranking professionals from the Jerusalem Transportation Master Plan, the Hebrew University, Ministry of Homeland Security - Cities Without Violence, Israel Police, Planning and Security Departments of the Jerusalem Municipality and the Planning Directorate of the Ministry of Interior. The workshop included lectures, field trips and round table discussions. Results from this workshop were followed by personal interviews and data collection, all of which are summarised in this case-study.

6.3. Security Through Planning and Design in the Jerusalem Public Transportation System

The new LR has brought new security challenges that have led to a shift in the security paradigm for Jerusalem. The city has struggled in the past and continues to confront terrorism and violence especially in public spaces where there is an emphasis on public transport. This has placed public transport as a main factor for the development of the city's resilience programme. The creation of a sense of security, both from terror and crime, in public transport has become a major consideration for national and municipal entities together with operators and users (jtmt.gov.il, 2016). Security in public transport must be maximized while at the same time avoiding changes that can harm the city's atmosphere and its daily activities, including the ongoing flow of visitors and the running of the public transportation network (<http://mops.gov.il/Mezila>, 2016).

There are a number of components that require special consideration. The case-study analyses the complex security challenges from the point of view of the people who are in charge of public safety and security for the public transportation system in Jerusalem through practical questions:

Network and stations:

- What is the best means to enter transportation spaces (carriages, LR stations and central station) without creating the security hazard of the queues?
- What is the optimal design of these spaces to prevent human traffic jams?
- Is there a need for a security inspection for each person who enters these spaces?
- What would be a new and practical method to create a protected space for commuters?
- What is the best way to mitigate the danger from terrorists running over passengers an LR stations?
- What is the best method to secure a network of hundreds of buses moving throughout the region?

Carriages and buses:

- What would be the best method to secure a LR carriage with a constantly changing volume of passengers?
- What is the correlation between security from terror and criminal activity in the carriages?
- What is the best method to identify and stop attackers in a dense carriage?

From this shortened list of questions and challenges, drafted by security people, arises a complex situation of a very delicate balance between the use of means that will increase the security and allow quick response, and a possible negative impact on ordinary users of public transport that may be caused by over exposure of security means, such as placing an armed security guard at each LR station (mops.gov.il/Mezila, 2016). It has been shown in research that although a high level of security might be obtained at a high cost per person, these spaces usually cause discomfort and sense of danger (Urban Resilient Design Guidelines, 2014). This is especially true in a city catering for tourists and pilgrims. Jerusalem's city security officers and urban planners are aware of this delicate balance that needs to be achieved in order that security and the mitigation of possible threats is consistent with maintaining a resilient, free and open environment that will provide a sense of security and a relaxed space (jtmt.gov.il. 2016).

Public transport is an essential, efficient and a secure solution to decrease traffic overloads in the cities and urban clusters, connecting suburbs to their urban hubs. It allows for maximum mobility, commuting to work and for consumers of commercial, social and cultural services of the hinterland and therefore becomes a main socio-economic axis. This is critical for the ability of an effective and stable mass public transport system. Among efficiency indicators of public transport are:

- Service – numbers of passengers and especially their sense of security;
- Availability -the shortest distance from the passengers' home to the station;
- Frequency -the shortest time between trains;
- Coverage - the ability to access maximum number of destinations.

Security and sense of security are basic conditions for all other indicators while the main characteristics of public transport, would be its accessibility to wide sectors of the public, volume and frequency. Due to these features, it is vulnerable to the threats of terrorism, violence and vandalism (Urban Resilient Design Guidelines, 2014).

Operators of public transport networks are also exposed to criminal activity such as theft of equipment and infrastructure damage and anti-social behavior. Resilience of the public transport system is managed through a set of activities designed to prevent infiltration of terrorists or bombs in the stations and carriages, and to protect the people operating and using them from attempts to

harm. At the same time, the security plan is designed to prevent felonies of property, and attempts to damage transport company assets or from an unauthorized use of them.

6.4. The Central Bus Station

The Jerusalem central bus station is located on Jaffa Street in front of "Benyanei Ha'aoma" the national conventions centre, in a 10-storey building with a façade of over 250 metres (Fig. 6.3.). The station is the main public transportation hub for the inter-urban, suburban and inner city lines and is the centre of a larger transport hub, which includes buses, a connection to LR line and a direct connection to the underground high-speed train station of connecting Jerusalem with Tel Aviv.



Figure 6.3. Aerial view of the Jerusalem Central Bus Station

In addition to being a transportation hub, the building contains a mix of other uses: a three-story shopping centre, a synagogue, and government and private offices. The station is a roofed building, including all platforms located on the third floor, so there is no need to exit the station to board the major inter-urban bus lines. Due to the expansion of the Jerusalem hinterland there are also suburban bus stops around the building.

Security at the central bus station

All of the station, inside and out, is monitored with CCTV from a control room. From an engineering aspect, there is a reinforced concrete layer in the ceilings, as extra prevention for the collapse of the building in the event of an explosion.

The security arrangements at the central bus station have changed over the years. In the past, each passenger arriving was required to pass a security examination through a metal detector. This

process had a negative side effect. The queue behind the security check became a hazard itself and a target to attackers outside of the building (Working Together to Protect Crowded Places, 2011). While the security team was also supervising this queue, the outside of the building remained a hazard for all standing outside the station itself and unpleasant during winter rains and summer heat.



Figure 6.4. Field visit to monitoring and surveillance room at the central bus station (photo by Liel Ben-Ami)

These security arrangements created a problem that led the central bus station security force to look for a more successful alternative solution. In recent years, it was decided to cancel the x-ray checks at the entrance of the building. Instead, new security tactics allowed a free entrance and continuous flow without a stop for inspection at the entrance to the station. To compensate for the loss of the x-ray capability of all people entering the station, the new tactics relied on a security structure based on an array of security guards inside and outside the station, in several security layers based on spot checks and visual inspection of suspicious behavior. In each of these cordons, the security guards are trained to identify suspicious characteristics reflected in behavior, body language and clothing that will allow them and others to identify and apprehend a suspicious person. Some of the security forces became undercover acting under the same procedures for observation and monitoring.

6.5. The Jerusalem Light Rail

In light of the introduction of the LR to Jerusalem, and its massive urban change, city security decision makers developed a system that is more sophisticated, more covert and which provides the ability to inspect, view and act in each the spaces (carriages, stations and central station) with minimum damage to the normal way of life in the city and the constantly changing environment (jtmt.gov.il, 2016).

This case study will explain the challenges and different options to solutions concluding with solutions that were finally selected. Also, the case study will explain the "weaknesses" of the system and the current drawbacks in its operating system.

The deployment of the security in the LR system

The goal of the LR security programme is first and foremost to mitigate hostility and attempts to damage human and LR properties. However, this goal is to be achieved through a balanced programme that evaluates not only the security needs but also evaluate their effects of the city, users and workers of the LR. The security programme achieves its corporate responsibility goal while addressing the issues of control and respect for all users, employees and the general public in a relaxed manner. The security system is designed to enable security staff to function effectively in emergency situations and in routine passengers' calls. These objectives can be summarized as follows:

- ✚ To safeguard the life of the passengers, employees, suppliers and customers while in the domain of the LR system.
- ✚ To protect the equipment and corporate assets from theft or vandalism and security plan based on loss prevention.
- ✚ To return normal activity as soon as possible after emergency situations through a contingency plan.
- ✚ To train the security personnel with state of the art technologies and operation techniques.

The main security assumptions can be enumerated as follows:

- ✚ Security is not a purpose but a means to allow the transportation of people to work efficiently from place to place and to maintain routine activity.
- ✚ The means have to be adapted to specific and changing hazards threatening the transportation company, its facilities and interests.
- ✚ Procedures are based on a combination of trained people and technical means. Placement of personnel must be balanced and adjusted to the nature of the hazards and routine tasks.
- ✚ Security measures are carried out in full coordination with local and national authorities and in accordance with the law and confirms with professional standards.

The Depot - control centre and monitoring of the Light Rail network

The operation centre responsible for the control and maintenance of the LR network is located on the "East Gate", between the French Hill and Pisgat Ze'ev neighborhoods. It is set on 4 hectares, of which there 9,250 square meters of built area. The different uses of the buildings include a control room, offices of the operating company, a garage, test platforms, maintenance workshops, and warehouses for spare parts with a special shop for the cleaning of the carriages. The depot is also used as a parking lot at night for the carriages.

All of the current 22 LR stations are monitored 24 hours a day, 7 days a week, by state of the art CCTV system. This system is the main tool for the LR security force to reduce their response time to various security scenarios. This special system also contributes to the sense of security of passengers as it enables them to receive immediate response.

Light Rail Stations

The light rail in Jerusalem currently has only one route along 22 km between Pisgat Zeev, a northern suburb of the city, all the way to the south west side of the city's Mount Herzl.

Along the route there are 22 stations (Fig. 6.5.). Each station is constructed with two open platforms allowing easy access to the 2 carriages. Along the platforms, there are usually two pavilions, shaded by trees and protected from rain. All platforms have vending machines for the tickets and seating benches.

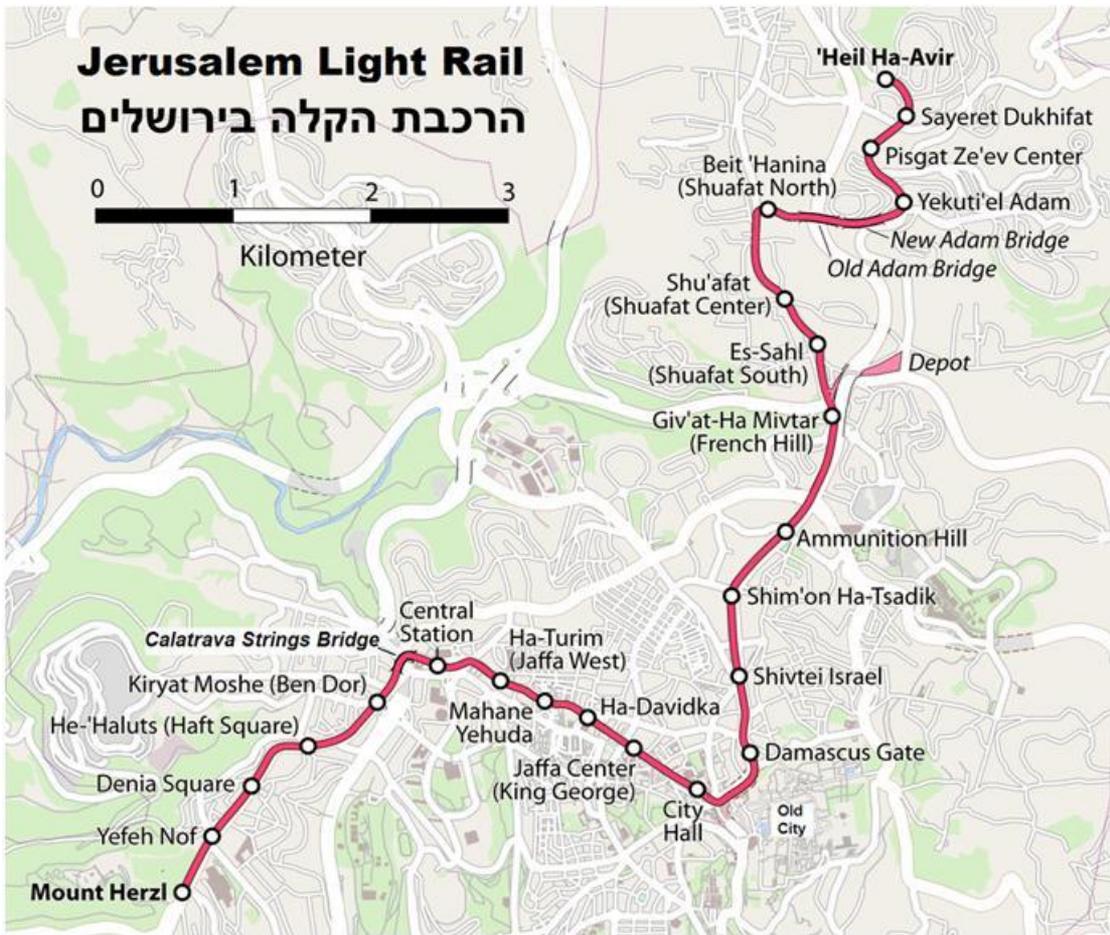


Figure 6.5. Map of the first LR line in Jerusalem connecting North and South ends of the city

Individual stations have curved transparent roof, following the concept of transparency which is reflected in the overall design of the system from policies to furniture. The technical elements include:

- ✎ The ticketing machines.
- ✎ Power rack positioned in the way that there will be no place to hide explosives.
- ✎ Hanging bench which does not hide any part of the pavilion.
- ✎ Garbage cans embedded in the body of station with narrow openings only. Initially, there were no garbage cans by the booths, however, this caused the people to throw used tickets on the floor so recently garbage cans were added. Also, there are some larger bins that are the responsibility of the municipality in the close vicinity of the stations.



Figure 6.6. Field study at the LR stop with Chanan Graf, Security Consultant, Jerusalem Transportation Master Plan Team (photo Liel Ben-Ami)

Each station also holds a variety of security elements (Fig. 6.7.):

- ✚ Cameras: the platform and two structures are monitored by 2 PLZ cameras (camera controlled by remote and able to turn around and focus on the selected point) located on the opposite platform which are controlled from the main control and monitoring room of the railway HQ.
- ✚ Emergency button: all stations has Help button that is normally used for the provision of information, assistance and guidance in the process of purchasing tickets. However, in distress it is used as an alarm for help. The security officers have the ability to quickly analyse the situation in an efficient way, while in times of emergency, the operator can contact directly the security officers while focusing on the light rail station where the emergency happened and provide real-time images of the situation.
- ✚ Protective pillars: In response to the issue of vulnerability to car terror attacks, the by running over passengers waiting on the platforms, the LR security added cast iron bollards protecting the platforms from terror attacks by cars.



Figure 6.7. Stations and carriages of the Jerusalem LR network (photos by JTMT)

6.6. Conclusions

In this case study we have described several topics regarding the procedures and design of the security of the public transport system in Jerusalem. From the examination of the security challenges, we see that the public security system is dynamic and always seeking new approaches while adapting itself to changes in the spatial data.

This has included modifying the security procedures at the central bus station and the design characteristics of the physical structures at the Light Rail stations. The design of the training of the security personnel is a critical aspect of the ability of public transportation to provide safe transportation.

Security hazards constantly evolve. Therefore, design for security in public transport should be flexible and easily be modified. Design for security in the public transport system should aim for minimum interference with the public spaces. Keep the space as clean as possible from infrastructure that is dedicated only to security. Rather, design for security should be assimilated into existing infrastructures and should consider different cultural attributes of segments of the society it serves.

Open environments allow visibility and free flow of people providing safety to passengers with the planning of the public transportation system providing accessibility for all sections of society providing resilient multi-solutions.

7. Safety on Intermodal Hubs – The Case of the Liège-Guillemins Railway Station

Philippe Hanocq, Guillaume Dufert (Belgium)

7.1. Introduction

The new Liège-Guillemins railway station was inaugurated in September 2009. With some 30,000 travellers/day, it is the 11th railway station of Belgium and the 3rd one in Wallonia. It is also, with Bruxelles-midi and Antwerpen, one of the three Belgian railway stations served by the high-speed train network (Thalys and ICE in destination to France and Germany).

The railway station itself, the work of the Spanish architect-engineer Santiago Calatrava, is a wide umbrella structure including a commercial gallery and an underground parking. This building is designed to accommodate up to 50,000 travellers/day (Fig. 7.1.).

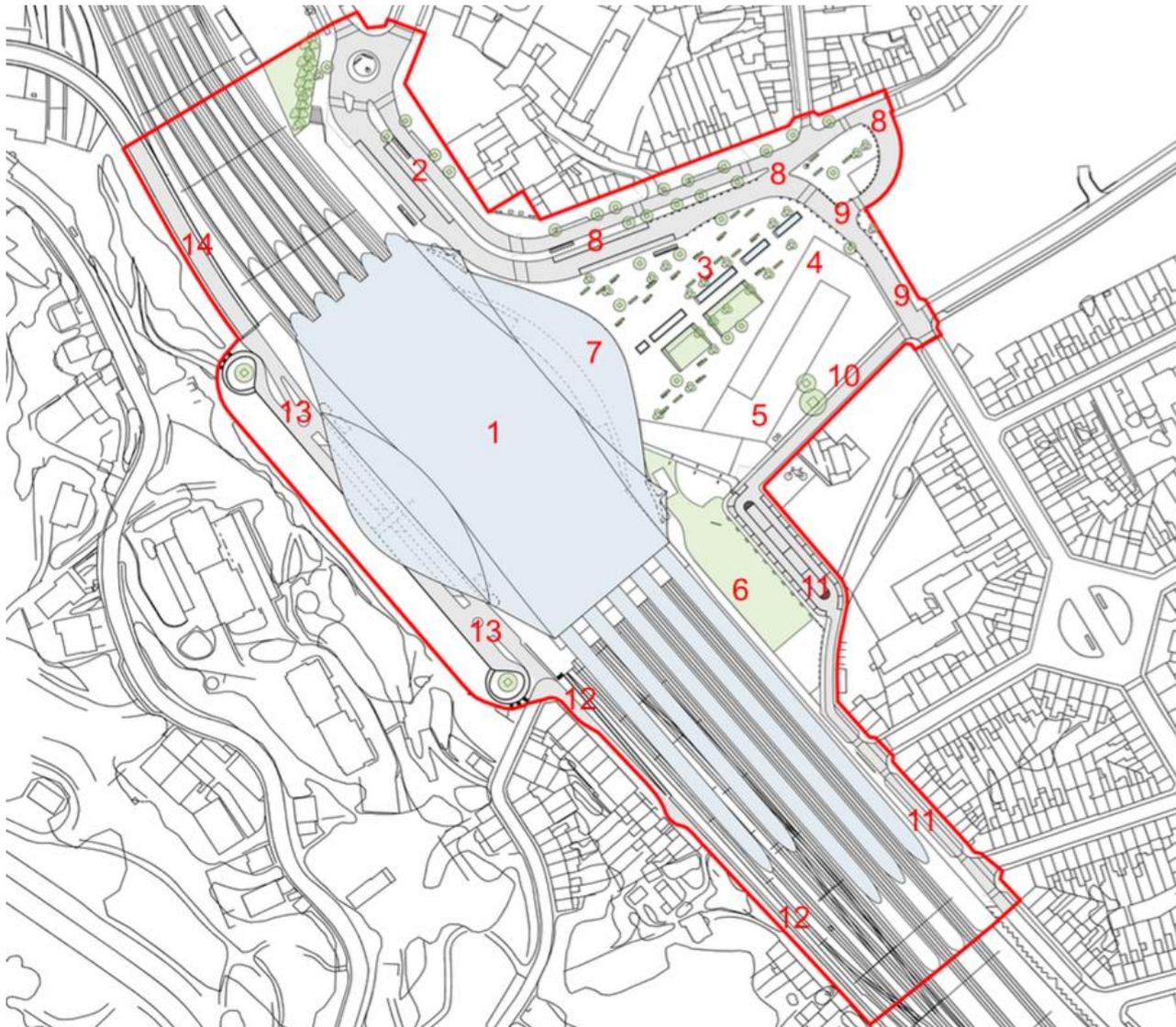


Figure 7.1. Schematic map of Liège-Guillemins railway station and its surrounding public space, within the study area

It represents a prime intermodal hub. Actually, it is served by :

- ↘ The highway/road network. The motorized users have at disposal indeed, on the back of the station, a long-term parking building counting 750 places as well as a short-term parking zone (Kiss and Drive) connected to the E25-A602, giving direct access to the railway platforms and enabling the management of approx. 3,000 daily movements.
- ↘ The Liege area public transport network. At the front of the railway station, at a distance of 100m to 200m of platforms, a city bus station receives approx. 1,600 bus/day generating over 15,000 daily users movements. Furthermore, the station is a major hub for the local taxi companies.
- ↘ The bikes and the pedestrians. The building is designed to allow connections as easy as possible between the 2 banks of the railway tracks network as well as with the boarding platforms. These connections are achieved firstly through a « commercial gallery » under the tracks, managed as a private space (closing between the arrival of the last night train (1:30 AM) and the departure of the first morning train (5:30 AM), and secondly through 2 « bridges » up the tracks managed as public spaces (unrestricted access and uninterrupted opening day or night). Moreover, cyclists can find inside the station dedicated sheltered parking places and various amenities (rental, repair shop).

The commercial gallery counts twenty local shops mainly from the HORECA sector – restaurants, snacks, coffeeshops etc. completed by gift and newspaper shops, a drugstore and the transport and tourist oriented business – ticketing, information etc.

The railway building is « secured » by regular patrols of the railway police and by private security companies mandated by the shopkeepers. Additionally, the Federal Police has in the building a permanent office and places are under constant video surveillance (a hundred cameras cover either the platforms and the commercial gallery, the parking and the cyclo-pedestrian connections).

The station opens on a public square in constant transformation since 2009. The amenities of this square are intended to ensure a quality environment, coherent with the prestige of the station, but also convivial enough and safe for multiple users who use this space daily (including users who pass from the bus to the train and vice versa but also tourists since the square is the link between the station and numerous events – museum, park, banks of the Meuse etc.). Security on this space is the responsibility of the Liege Local Police who conducts both repressive actions (verbalization) and dissuasive/persuasive ones (awareness actions, preventive interventions in collaboration with other communal services – e.g. cleaning etc. - and/or in response to citizens' requests).

7.2. Research Methods

The study method

The present study of insecurity problems posed by this extremely important intermodal hub at the scale of the city of Liege is based on the double analysis :

- ↘ firstly on a statement of objective insecurity identified in the station and its surroundings by the police between 2007 and 2015 ¹³ ;
- ↘ secondly on a survey on the feeling of insecurity (subjective insecurity) conducted in 2015 by the operator of the station (SNCB – Belgian National Railway Company) ¹⁴.

The statistics on crime (objective insecurity)

As already noted, the railway station of Liège-Guillemins is an intermodal « hub » extremely important at the scale of the City of Liege. As such, the station and its immediate surroundings are among the busiest areas of the city, with a remarkable presence of users spreading over time. Actually, unlike the commercial streets of the urban center, the station and its surroundings attract the public both day and night, very early in the morning or very late at night, either during school periods and holidays. This « functional » attractiveness is further enhanced by the existence of the « commercial gallery » and its many shops, and because of the almost continuous program of events in the station or near it : since the inauguration of the building, one parking level from three is de facto dedicated to host cultural events attracting a large public ; in addition, the esplanade in front of the station regularly hosts original events (ice rink, ice sculpture, circus etc.) which maintains quasi-permanent vibrant activities on the site.

« The opportunity making the thief », no surprise therefore to identify an important « small » criminality (pickpocketing, altercations, drug traffic etc.) directly related to the high level of « co-presence » despite the significant control means implemented (video surveillance, frequency of police patrols, security services etc.). One can assume that drug traffic is also probably related to the proximity of the Netherlands which, in this matter, is experiencing a more permissive legislation than in Belgium.

Furthermore, the specificity of travel by train also induces a strong demand for parking, partially unsupervised, which in turn generates a specific type of crime (theft in and of vehicles).

Finally, as any international transit area, Liège-Guillemins train station is the drop point of a possibly illegal immigration.

¹³ Police fédérale de Liège – DCA – Service d’Analyse Stratégique – Laurence Kersten, « Analyse de la criminalité dans et aux alentours des gares et points d’arrêt de la Ville de Liège – De 2007 à 2010 », Déc. 2010 ; ISLP versus BNG - Observatoire de la criminalité de la Police de Liège – Carmelo Troisi, « Statistiques de la criminalité aux alentours de la gare de Liège-Guillemins et de la Place Saint-Lambert », Mai 2016 ;

SNCB – Mégan Zangerlé, « Nombre d’appels passés au SOC (Security Operation Center) pour les faits d’insécurité entre 2011 et 2015 en gares de Liège-Guillemins et Liège-Palais », Juin 2016.

¹⁴ SNCB – Mégan Zangerlé, « Résultats de l’enquête sur le sentiment de sécurité en gare de Liège-Guillemins », Avril 2016.

Very concretely, between 2007 and 2010, the police registered on the site of Liège-Guillemins (railway station and surroundings) about 1,250 crimes per year which were distributed in the following categories (Table 7.1.) :

Type of fact	Number of facts by year in mean	Repartition in % of the total of facts
Thefts	420	34%
Attacks on the person	180	15%
Drugs	140	11%
Illegal immigration	100	8%
Vandalism	80	6%
Other	330	26%
TOTAL	1.250	100%

Table 7.1. Categories of crime at Liège-Guillemins railway station that were registered by the police

Thefts are coming well ahead of the listed offenses. Thefts are divided into the following categories :

- thefts from buildings	~ 100 facts/year	23%
- pickpocketing	~ 85 facts/year	20%
- thefts from vehicles	~ 85 facts/year	20%
- robberies with violence	~ 45 facts/year	11%
- thefts of vehicles	~ 35 facts/year	9%
- armed robberies	~ 10 facts/year	3%
- other thefts	~ 60 facts/year	14%
TOTAL	420 facts/year	100%

Unsurprisingly, pickpocketing occur overwhelmingly in the station or on the esplanade directly in front (~65% of the facts registered in the whole area mapped on Fig. 7.1.) and during the day between 9:00 AM and 4:00 PM, when the density of movements is at peak. The rest occurs in the directly adjacent streets.

Thefts from or of vehicles happen on all the streets around the station, especially for unsupervised parking places. These facts are also held mostly during the day when the density of parked vehicles is at it' s peak. Other facts of thefts do not show characteristics that could be correlated with the existence of the station, except the development of an expanded commercial device that attracts a specific crime, possibly violent (armed / violent robberies).

The second category of offenses is related to attacks on the person. These are as follows :

- Violations of moral integrity (threats, harassment)	~ 90 facts/year	50%
- Violations of physical integrity (assault and battery)	~ 80 facts/year	44%
- Violations of sexual integrity (rape, exhibitionist)	~ 10 facts/year	6%

TOTAL

180 facts/year

100%

Unsurprisingly again, the station and its immediate surroundings concentrate a clear majority (80% !) of recorded facts in the whole area. Those facts occur mostly during the day (in 75% of cases), probably due to the density of the potential interactions between the many users of this space and at such times. However, the significant impact of a very particular crime occurring in a street traditionally dedicated to prostitution (rue Varin), close to the station, will be noted. In this street, the litigious facts of the category « attacks on the person » are recorded mainly at night (between 10:00 PM and 6:00 AM).

Facts related to drug trafficking and illegal immigration have always (100%) for setting the station, the esplanade and the street dedicated to the aforementioned prostitution. The interloping nature of specifically nocturnal activities around the station (bar, prostitution) and the presence of authorities in charge of illegal immigration explain this concentration.

However, vandalism (criminal damage to private property, mostly vehicles) and incivility appear to concern only a bit the station and its esplanade (barely about ten facts listed by year in mean, representing about 10% of similar facts recorded in the neighborhood (perimeter mapped on Fig. 7.1.) and less than 1% of all crimes recorded by the police on the site). The special supervision to which these places are subjects (patrols, cameras) seems quite effectively to deter those « minor » formes of delinquency.

Crime statistics for the period 2007-2010 can hardly be compared to the police data for 2011-2015, the modalities of the survey being hardly compatible. The distribution between the various categories of reprehensible facts remains somewhat stable as can be judged on the basis of the elements in our possession.

Surveys on the feeling of insecurity (subjective insecurity)

In 2015, the SNCB has launched a survey on the feeling of insecurity felt by users of the railway in Liège-Guillemins station. 1,000 questionnaires were distributed. The response rate was about 16%.

First, the station appears as a generally safe place (80% of respondents feel safe). If the building itself seems to offer a very satisfying feeling of security, this is not entirely the case of its surroundings (esplanade and adjacent streets) judged rather insecure by 45% of respondents.

Then, the night and the evening (between 8:00 PM and 6:00 AM) are the moments judged the most frightening by 93% of respondents.

Moreover, the main victimization facts concern (in decreasing order of importance) are as follows :

- ↘ Facts in relation to drugs and alcohol, whose 70% of respondents say they have been victims or witnesses ;
- ↘ Violations of physical or moral integrity (fights or insults) which concerned 50% of respondents ;
- ↘ Thefts whose over 40% of respondents have been victims or witnesses .

Finally, the feeling of insecurity results for its part mainly (in decreasing order of importance) because of the following factors :

- ↘ From the confrontation with the facts in relation to drugs and alcohol cited by more than 60% of respondents ;
- ↘ From fear of violations of physical integrity (fights) for approx. 50% of respondents ;
- ↘ From risk of thefts cited by just under 50% of respondents ;
- ↘ From risk of terrorist acts cited by 45% of respondents ;
- ↘ From the exposure to vandalism facts also cited by 45% of respondents ;

7.3. Learning from the Liège-Guillemins Case Study: Strategies and Proposals to Improve Safety on Intermodal Hubs

What lessons can we draw from this survey and from confrontation with crime statistics resumed in the first part of this study ?

- ↘ Regarding the exposure (real or perceived) at any risk, the facts in relation to drugs and alcohol appear significantly overvalued compared with actual interventions of the police services (11% of verbalized facts, comparing the mean values). This could mean that the fears of users probably fall more from discomfort associated with certain behaviors perceived as « antisocial » than from an actual victimization. The facts in relation to drugs and alcohol seem characteristic of these places of transit and intense mixing that constitute the transport nodes. These spaces shared very temporarily by a group of individuals, foreign to each other, are by definition hardly appropriated by a structured community, invested by some form of responsibility for the place. The marginal or « deviant » behaviors (compared to an assumed standard) may therefore be more frequent there especially if the environment is perceived as favoring the standard erasure (in this case : the presence of bars, prostitution, proximity to the Netherlands recognized as easy source of drugs supply etc.). It is interesting to note that the new Liege station, prestigious building if it is, contributes to a radical transformation of the neighborhood that tends to « gentrify » it or, at least, to align it with the standards imposed by major real estate investors. In this perspective, the demand to curb behaviors considered as « asocial » or « atypical » will with no doubt be strong.
- ↘ Regarding the « attacks on moral and physical integrity », the fear of being exposed or the feeling of having been confronted to such facts are again significantly higher than the actual verbalization (15% of the whole verbalization, in annual mean values, are effectively concerning such facts while the fear of being victim of such facts – victimization - concerns approximatively 50% of the respondents). In this case, however, verbal or physical aggression may represent more than discomfort and lead to real victimization without the alleged offense does lead to a complaint registered in proper form, due to fear of reprisals, lack of evidence, by weariness or cowardice etc. It seems again that the transitory nature of social relationships that can be established in such places of passage, combined with the density and the diversity of potential contacts between users, can lead to a blurring of the standard usually regulating

social life. In this respect, the quality of amenities, the profusion of available spaces that can accommodate a large variety of activities in good conditions regarding the promiscuity or the density of use, the constant reminder of the standard by the services invested with a persuasive or repressive authority, are helping to limit interpersonal clashes. It is demonstrated by a comparison between the stations of Liège-Guillemins and Liège-Bressoux which have two diametrically opposed faces in spatial quality, range of activities and effectiveness of surveillance. In Liège-Guillemins where the overall quality of the environment is deemed highly satisfactory by more than 60% of the surveyed population, attacks on the person concern 14% of verbalized facts while they represent 23% in Bressoux where conditions are much less favorable for the three mentioned criteria.

- ↳ Regarding the thefts, the feeling of insecurity is in line with the statistics of the police action. One has to be clearly stated, that this category of crime is highly correlated with the density of use of space and the resulting proliferation of potential targets. For example, if the focus is on pickpocketing, it represents 20% of all thefts in Liège-Guillemins against 7% in Bressoux which is an uncrowded station. Additionally, the pickpocketing occurs overwhelmingly in the day, when the crowd is at peak. The architecture of the space can also play a role in providing for example less latitudes to the offender who would want to escape after committing his crime, at the risk however of a deterioration of architectural or plastic quality of spaces. Prevention as well as recognized and effective proximity control seem by evidence reassuring users, at least partly. Indeed, a question of the survey on insecurity was about the presence of the security forces. If the respondent population showed generally very confident in the presence of security forces (confidence level approaching 90%), it was however much more critical about the effectiveness of their interventions (confidence level falling below 40%).
- ↳ Fear of exposure to terrorist acts is purely conjunctural and symptomatic of the times, even the expression of extreme media outreach (Paris was just coming off the attack against the weekly « Charlie-Hebdo » and a terrorist cell had been dismantled few days before the survey, in Verviers, a town near Liege). Nevertheless, an important field of research certainly opens up in this domain to provide satisfactory rather simplistic answers to ensure protection against terrorist madness in places such exposed as the intermodal « hubs ».

8. Crime Prevention through Environmental Design of Pedestrian Routes

Karel Schmeidler, Kateřina Maršálková (Czech Republic)

8.1. Introduction

This article offers short visual and theoretical description of development of Czech attitude to pedestrianisation of the Czech cities from the early sixties to comprehensive solutions within the recent years. Safety and security aspects, which are crucial for proper function of pedestrian mobility are highlighted.

8.2. Research Methods

We have been working on pedestrian quality needs for many years in frames of many national and international projects and studies related to sustainable green mobility (Schmeidler, 2012). Sociological surveys were selected as appropriate research methods, i.e. questionnaires, interviews and in some cases in depth interviews, supported by statistical and logical analysis. Analytical tools, that we were using for this research, allow examining the propensity to safety of an existing area; this knowledge is useful for urban and transport planners, technicians, social services, maintenance services, local police, local politicians, developers, citizens and other stakeholders. Pedestrian quality needs and their fulfilment are the research objects in this study. Inhabitants of various cities are research subjects. The cities are divided into groups according to such criteria as settlement size, its function, growth of the city and metropolitan area etc. Then, after a detailed analysis, the guidelines, recommendations, and norms are provided (Schmeidler, 2008). They are tools which support planners and designers in their projects reminding them clearly which are the factors of the urban environment that have an impact on safety (in many cases they were applied in case studies). Successful solutions were selected as case studies and were compared and evaluated. Finally, the tools that provide the criteria for assessment of impact of urban developments on safety are prepared.

Evolution of pedestrian streets in Czech Republic

From the beginning of car transport development in Czechoslovak cities, little attention have been paid for pedestrians. With the growing number of vehicles and roads after revolution in 1989 pedestrians' position is becoming even worse (Staňková, 2008). Unequal position of pedestrians is also emphasized by their significantly greater vulnerability in the road traffic as compared to other road users (Schmeidler, 2009). The other problems are related to the lack of security and higher crime rates in some often used urban areas (Schmeidler, 2001). These circumstances have been highlighted more frequently only in recent years, when relevant solutions have been made on the

national scale particularly solutions regarding making the roads, streets and public spaces in Czech historical towns safer, secure and friendlier to pedestrians. In early sixties the first pedestrianised streets were designed in Czechoslovakia. But they were fragmented and played minor role in the modal split of urban transport. Some of them are perceived as dangerous because of higher crime rates there. Besides some success in central city areas they have been criticised by the citizens for visual and orientation problems, fragmentation or lack of complexity, questionable safety and security, vulnerability of some pedestrians and restricted functions (Schmeidler, 2008). During the next decades the attitude has been changed. The priority was given to design direct, safe and pleasant connection through the whole city to reach all the points of interests and activities. Some key studies and built urban examples will be presented in the following sub-sections in relation to Czech condition and important planning principles.

Safe city for pedestrians

Experience with traffic control and planning the development of towns has demonstrated that supporting walking as a green mode of transportation and ensuring harmony between traffic and town infrastructure presents one of the most serious problems of contemporary communal policy (Schmeidler, 2010). This problem involves two levels of treatment. On the social level, it is a question of the social, economic and cultural problems in the processes of town planning; there is the possibility to control these processes, with the aim to secure more safety and security. In this way we could orchestrate the restructurisation, remodelling and sometimes optimisation of public spaces in towns and their functions. Furthermore, it is a question of value orientation of the society in its approach to economic development, to the protection and creation of pleasant and sustainable living environment, and to the development of sustainable modes of transportation. At the level of operational and developmental control of the city, it is a question of selecting the optimum sustainable multimodal transportation system, of ensuring pedestrian and cyclist security and safety, and of removing or minimising the negative influences of traffic on the urban environment by support of non-motorised and green modes of transportation. This is especially possible with regard to ensuring harmony between the city structure and the traffic network including pedestrian pathways, and to maintaining a balance between organized operational exploitation and the determination and development of an acceptable level of urban growth in a given area.

General principles related to urban planning and design

The basic requirement for a purposeful planning process is the understanding of the multi-layered mechanism of urban transport, pedestrian security and safety needs and their effects on the urban structure and environment. Over the last few decades, basic research has gained a better understanding of the regularities and cause/effect relationships regarding mobility, urban development and transportation. Of particular interest are the complex, dynamic, and time lag-determined connections between sustainable traffic, land-use, urban planning and their effect upon the environment (Robes, 2002).

Walking is the most natural and the healthiest form of mobility; however cities have not always evolved to accommodate the needs of pedestrians and walking has in many cases been neglected in the development of cities and their transport systems (Gehl, Gemzoe, 2002). Improving the pedestrian environment can contribute significantly to meeting the challenges of fast changing lifestyles, demographical change, equity questions, health improvement, air pollution and climate change (Gehl, 2000). This chapter aims to present urban and transport planners and decision-makers with hard evidence on the important place of walking in transport policies and provide guidelines for developing a safe environment conducive to walking. This is an essential contribution to creating liveable cities with good and secure accessibility. Every single trip begins and ends by walking.

8.3. Security and Safety in Public Spaces

Insecurity in public spaces, whether real or perceived, has a major impact on the choice of the walking route and the use of public transport, especially for women, children and elderly people (OECD, Paris, 2002). The observed decline in walking among children, that is partly motivated by the risk perceived by their parents, is of particular concern. Pedestrians are very sensitive to many environmental and social factors affecting their perception of security and safety: the legal framework concerning crime and vandalism, surveillance and police presence, social features of the area (sense of place, local social characteristic, social ties and integration, solidarity, etc.), urban facilities (surveillance, lighting, the space design and location of paths, street furniture and vegetation) and urban features (density, land use distribution, street and square layout, etc.). Sociological surveys and studies of opinions have shown that anti social behaviour is systematically associated with a long-term effect on pedestrian behaviour and perception of public safety. Vulnerable members of the society such as women, children and the elderly are more sensitive to crime or fear of crime, and this can often lead to a decrease in their mobility and participation in outdoor social activities (National Development Programme of Mobility for All, 2001).

Thus, security issues appear to be fundamental in the construction and implementation of a pedestrian-friendly policy (Schmeidler, 2005). Today, urban security is beside the traffic safety that is integrated into broader urban policies. Therefore, urban security is a shared target, a prerequisite for better sustainable mobility, public tranquillity and peaceful enjoyment of all public spaces for all citizens.

8.4. Improving Personal Security for Pedestrians

Theories for addressing unsocial behaviour and fear of crime are now based on increasing natural surveillance provided mostly by local people. Most experts and practitioners now agree that a

combination of both social prevention and situational prevention is required to achieve an optimally safe public place. Eliminating insecurity within a public domain often involves promoting sociability and vitality and facilitating the presence of as many people as possible in a given space. Public spaces are successful when they encourage a wide range of activities and various uses (Jacobs, 1961). Urban safety contributes to formalising the intuitive relationships of reciprocity between quality of life and pedestrian mobility.

8.5. Preventing Crime

Social prevention and situational prevention are required. In ITF/OECD countries, common ways to improve pedestrian security include enforcing appropriate crime and vandalism regulations, by providing better and appropriate street design enabling presence of people and their supervision, effective or innovative lighting, increasing the number of security staff and installing video surveillance (VS, CCCs – close circuit cameras). Video surveillance is potentially one of the fastest spreading technologies amongst ITF/OECD member-countries, but it is controversial, due to several legal issues related to protecting the integrity and privacy of people. Video surveillance appears to work best when it is integrated as part of a package of safety measures, particularly in town centres. Camera systems should be fully integrated into police command and control strategies, and be used to assist decisions concerning the deployment of officers and how best to coordinate a response to incidents.

8.6. Importance of Healthy Social Ties

The safety and security in public space is related to the social climate, to the strength of social ties in neighbourhood and in public space (sociability), which are in the fact community resources (respect for others, for community values, voluntary sharing of community resources, respect for rule of law, etc. (Schmeidler, 2008).

8.7. Safety and Security when Walking

Achieving urban safety and developing effective safety-related policies requires the input of various professionals in the community. The skills and experience of those in charge of public order and crime prevention, technical services, socio-educational organisations, public transport personnel, residents, architects, urban planners, urban designers, stakeholders and decision makers are required.

8.8. Recommendations - How to Create Pedestrians Friendly Environment

To provide access for pedestrians to places of activities and points of interest, clear, secure and safe routes across all parts of the city should be created, complex pedestrian and/or bicycle network should be set up.

To assert comfortable routes both from the technical parameters, safety and security point of view, pleasant feelings and with regard to user friendliness of the proposed solutions the set of measures should be applied.

For sake of pedestrians the green transport mode is suggested to give preference to single level crossings inside the city with application of modern safety and calming down elements. Even though single level crossings reduce automobile traffic they provide to pedestrians the needed user comfort and safety if designed correctly. Multilevel crossings should be designed to minimise loss drops and provide better facilities for persons with reduced mobility and orientation.

System approach

- Systematic design of complex pedestrian routes with services needed should be preferred.
- To provide comfortable and safe walking connections within all city areas and points of activities mutual links between areas of activities should be planned.
- To provide walking connections between the individual residential and other urban areas of the city.
- To provide walking connections to the city outskirts with facilities for rest, leisure and recreations of the citizens.
- To provide walking connections to the surrounding municipalities.

Safety - conditions for safe pedestrian movement

Urban structure refers to the urban fabric, main urban pattern of streets and public spaces of the city. It shows the continuity of the urban fabric as well as the discontinuities deriving from some physical barriers like highways, railways, rivers or by large building complexes. The focus is not the built or unbuilt space: this map is about connectivity and free movement, as these are the important aspects for safety and security. If flows are interrupted, daily movements are discouraged and the city is less used, less known and less safe (Kurfurst, 2002). To provide safe and secure pedestrian movement, some points should be respected:

- To assert application of modern elements of traffic calming down, such as raised pedestrian crossings, slow-down islands, elements for reduction of passage speed etc. Traffic professionals exercise long-term efforts at introduction of modern traffic calming down and traffic safety elements to practice.
- To provide for location of pedestrian crossings to natural pedestrian routes. The most inconvenient way from the pedestrian safety point of view is the current practice of placement

of pedestrian crossings in the crossroads off the adjacent pavement line. Pedestrians then continue along their natural routes, cross the street off the crossing situated behind the block corner and thus the inconveniently situated crossings do not add to pedestrian safety, rather making the situation even worse.

- ✚ To provide for protected pedestrian crossings on access routes to schools and healthcare institutions for casual transport participants like children, the elderly and mothers with prams.
- ✚ To prefer separation of walking and cycling paths where it is possible, rather than to build joint pedestrian/cycling paths.
- ✚ The description of the functions and of the use of land provides a general framework for understanding the use and social vitality of spaces which is so important for spontaneous control, surveillance and feeling of safety. It allows us to understand the pattern and calendar of use of spaces.

Technical standards

Conditions of technical standard of pedestrian routes should be applied. To provide for conditions for use of public walking areas pursuant to Decree no 369/2001 Coll., of the Ministry for Regional Development on general technical requirements for use of buildings by persons with restricted mobility and orientation. The access for all should be secured, and wheelchair access is one of the basic requirements for public spaces. Some important areas in the city centres still wait for implementation of this requirement (Patrik, 1997).

To provide for conditions for use of public buildings pursuant to Decree no 139/2001 Coll., of the Ministry for Regional Development on general technical requirements for use of buildings by persons with restricted mobility and orientation.

To provide for conditions for use of city transport stops pursuant to Decree no 139/2001 Coll., of the Ministry for Regional Development on general technical requirements for use of buildings by persons with restricted mobility and orientation; to resolve shortening and improvement of transfer routes in the changing nodes.

By preventive and consequent actions to create conditions for quality of walking routes along pavements and other public areas not to be negatively affected by objects forming obstacles to pedestrian movement. In addition to mobile obstacles, often permanently placed on the pavement, though, there are fixed objects in the form of pillars, switchboard and fuse boxes and other technological equipment

Feeling of security and personal safety

Feeling of safety and security is very important for vulnerable users and is based on balanced social usability and aesthetic quality of pedestrian areas. This includes some measures:

- To support development of walking routes by emphasis on surveillance and aesthetic quality of public spaces and pedestrian paths.
- To support development of walking routes by equipment of pedestrian paths, pedestrian areas, squares and parks with suitable street contents. Conveniently placed, aesthetically well designed and functional street equipment including benches etc. represent the most frequently used street contents.
- To support development of walking routes by equipment of pedestrian paths and areas with greenery, especially shading. The shadow of the trees planted along pedestrian paths creates pleasant environment attracting people to walk on the street. Surveillance and good visibility shouldn't be rescricted.
- To develop residential function of the current urban space and parks by intense maintenance or reconstruction of the urban areas; with the aim to increase their usability value for short-term recreation. The development of residential function of public areas not only pleasantly enriches the urban and surveillance function of environment, but also increases the feeling of security and thus increases the intensity of walking mobility.

Guidelines for moving pedestrians in urban setting

Pedestrians enjoy the secure and safe city environment and sustainable mobility, walk with no fear and enjoy confidence (Fig. 8.1, Fig. 8.2, Fig. 8.3, Fig. 8.4).

- Walking is healthy, look around, shoulders back and head up, be aware of your surroundings and trust your instincts. If something does not look or feel right, stop to see what has triggered your fear.
- Do not ignore your instincts. They are your first line of defense.
- Walk in groups. There is safety in numbers.
- If you sense that you are being followed, change your direction or pace. If the person following you does likewise, seek a safe place where there are people and lights and bring attention to yourself. Try to remember an accurate description of the suspect.
- Avoid undesirable areas or shortcuts. If you make a wrong turn, go back immediately. Don' t take chances.
- If approached on the street, make brief, stern eye contact and continue walking. If someone insists on talking, acknowledge his or her presence with a nod and continue walking. Do not stop and engage in a conversation.
- Never get into a vehicle, even if forced at the point of a gun. Your chance of survival on the street is better than in a vehicle or remote location of the abductor' s choice.



*Figure 8.1. Picture illustrates the redesigned street space in Brno, Czech Republic, for pedestrians' safety and security, an example of pro-pedestrian policy and rebuilding of urban spaces.
Source: Drawing by G. Kopicik, Brno, FA VUT, Czech Republic*



Figure 8.2. Revitalisation of the street with additional aesthetic values and urban quality in City of Cheb, Czech Republic



Figure 8.3. Good surveillance and visibility in public spaces and roads in towns is perceived safer and friendlier to pedestrians



Figure 8.4. Tight co-operation with NGO's, local residents, pedestrian groups (Brno's walker), environmentalist

9. Crime and Safety on Parking Lots

Irina Matijosaitiene, Maria Dambriunas (Lithuania)

9.1. Introduction

The aim of this study is to verify if parking lots in Lithuanian post-Soviet cities meet the safety standards, and to identify the elements of an urban environment (according to CPTED strategies) that affect crime on parking lots.

Crime Prevention Through Environmental Design (CPTED) supports and develops great ideas on crime prevention through urban planning and design (Jeffery, 1971; Crowe, 2013; Cozens et al., 2005; Saville and Cleveland, 2008; Sutton et al., 2014; Atlas, 2013; Armitage, 2013). The process of designing security into urban planning and architecture is known as CPTED, and it is based on the proposition that the appropriate design and application of the built and surrounding environment can improve the quality of life by deterring crime and reducing the fear of crime (Atlas, 2013). The term Crime Prevention Through Environmental Design was first presented by American criminologist C. Ray Jeffery in 1971. CPTED differs from traditional security tools in urban planning and architecture. Traditional security tools mean building of fences, walls, installing of alarms, as well as police officers and guards on the streets. Whereas, CPTED focuses more on natural security strategies, such as natural surveillance, access control, territorial reinforcement, maintenance and activity support (Ekblom, 2013).

9.2. Research Methods

Research objects

Most parts of Lithuanian cities were built in the Soviet times. For this research five commercial objects with parking lots on Kreves street in the city of Kaunas are selected as a case study (Fig. 9.1.). This is chosen due to high crime rates (according to Kaunas County Police Headquarters, Kreves st. is one of the most crime-ridden and problematic areas), and the street being a typical urban tissue of post-Soviet residential areas. Kreves street is actively used by public and private transport (both local and transit), as well as residents of surrounding areas. There is a big variety of land uses along the street. The biggest part of the area is occupied with 5 and 9 storey multi-flat residential buildings with inner yards and playgrounds connecting them. There is also a variety of commercial objects (bigger supermarkets and small businesses, including kiosks), a couple of banks, kindergartens and schools (secondary and professional), and two parks along the street. The end of the street is built up with industry, storage and infrastructure objects, many of them are abandoned, though, it this part of Kreves st. is not included in our case study.

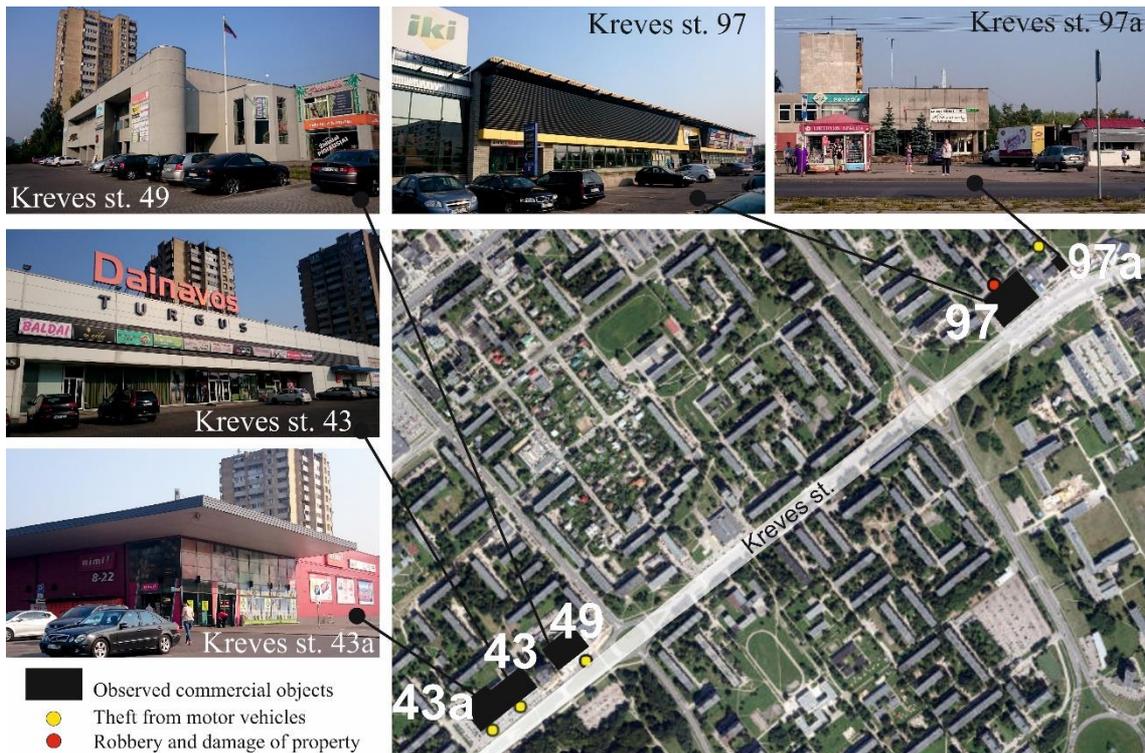


Figure 9.1. Research objects in Kaunas, Lithuania

Kreves st. 43a is a newly built Rimi supermarket. Kreves st. 43 and 49 are Soviet-built buildings with various small-businesses inside. Kreves st. 97a is also a Soviet-time building that is run by a funeral office now. Kreves st. 97 is a fully reconstructed Soviet building with a modern IKI supermarket on one side and automobile service on the back side of the site. Crimes committed on the site with a parking area (but not inside the building) are selected for the analysis. The only types of crimes committed in the research objects are as follows: theft from motor vehicle (9), robbery (4) and intentional damage of property (1). This is the reported and registered data during 2010-2011. It is worth to mention, that in Lithuania the level of latent criminality is very high. This means that many crimes go unreported to the police, especially in instances of crimes with low damage value estimated.

Methodology

The designed research process consists of three steps: 1) site assessment according to CPTED strategies, 2) analysis of current situation on every site, 3) identification of factors of urban environment that affect crime.

Thefts from motor vehicles, robberies and intentional damages of property are analyzed according to crime rates that are simply the number of crimes committed at the particular address.

For the site assessment according to CPTED strategies the questionnaire is designed based on the analysis of literature and existing CPTED audit and site assessment checklists in different countries. The questionnaire with 82 questions in total is divided into five blocks according to CPTED

strategies: 1) elements of surveillance, 2) elements of access control (and target hardening), 3) elements of territoriality (territorial reinforcement), 4) elements of image management (maintenance), 5) elements of activity support (Table 9.1.). In the developed questionnaire, many questions are designed to assess elements of landscape (trees, bushes, other greenery) and surrounding environment (fences, gates, paths etc.), as well as lighting (glare, color of light, illumination, height of illuminator pole, if different site areas and elements are well lit etc.).

Elements of surveillance	YES	NO
No blind spots or hiding areas		
The driveway, or where you usually park your car, should be visible from either the front or back door and at least one window		
Lighting placed in such a way that it allows people to be recognized from 7,62 meters away		
Elements of access control (and target hardening)		
Entrance to the parking area is equipped with opening gates or barrier		
Dead-end spaces are blocked off with fences or gates		
Elements of territoriality (territorial reinforcement)		
Entry points into the parking area are visible and well-defined (different paving material, changes in street elevation, architectural, and landscape design, signs, gates)		
Property lines and private areas are defined with plantings, pavement treatments, short walls, or fences		
Parking spaces are clearly marked		
Elements of image management (maintenance)		
Bushes are up to 0,91 meters high		
There is no evidence of graffiti		
Exterior lighting is maintained		
Elements of activity support		
The site is vibrant and well-used		
There is a diverse range of land-uses at the site		

Table 9.1. Extract from the questionnaire

For the identification of relations between nominal variables (elements of urban environment from the questionnaire that can be answered as , Yes ' or , No ') and scale variables (crime rate) Eta-squared correlation analysis and Chi-squared test were applied. A measure of association Eta-squared ranges from 0 to 1, with 0 indicating no association between the row and column variables and values close to 1 indicating a high degree of association. Eta-squared is appropriate for a dependent variable measured on an interval scale and an independent variable with a limited number of categories (for example, categorical variables such as answers , Yes ' or , No '). Small correlation is being observed at $\eta^2 \sim 0.02$, medium correlation is when $\eta^2 \sim 0.13$, large correlation is when $\eta^2 \sim 0.26$. The Chi-squared test is used to determine whether there is a significant relation between the 2x2 table variables.

Geographical Information Systems (GIS), as well as IBM Statistics 20.0 were applied for the data analysis and visualization.

9.3. Findings

Meeting the CPTED strategies

Five commercial sites with parking lots and surrounding environment are observed on Kreves street and checked according to the developed questionnaire, spending about 30 minutes for every site. Each element was assessed as 'Yes' or 'No', with the meaning of 'Yes' as the element meets CPTED criterion, and 'No' as does not meet. The research results demonstrate that the sites of the commercial objects (no matter if the object is a new built, fully renovated or Soviet-times built) are not designed to meet CPTED strategies at all. On different commercial sites the percent of elements meeting CPTED differs: for the elements of surveillance it is 30.43-69.57%, for the elements of access control it is 33.33-50.0%, for the elements of territoriality (territorial reinforcement) it is 30.77-71.43%, for the elements of image management (maintenance) it is 10.0-75.0%, for the elements of activity support it is 0-100%.

The access control (42% of observed criteria meet CPTED) and territoriality (41.1% of observed criteria meet CPTED) of observed commercial sites are the biggest issues on Kreves street (as well as on many others in Lithuania). In the most of observed cases the private property is not defined and entrance/exit points and paths to and from the site are neither controlled nor secured. The situation concerning activity support (73.32% of observed criteria meet CPTED) looks much better. In most cases, commercial objects offer a variety of activities for customers. Additionally, the sites are generally vibrant and well used.

Thefts from motor vehicles

According to the correlation analysis (Eta-squared is calculated and Chi-squared test is applied) results (Table 9.2.) there are relations between thefts from motor vehicles and three criteria according to three CPTED strategies:

- ✚ Natural surveillance strategy – the presence of white light color illuminating the parking area is related to thefts from vehicles ($\eta^2=0.890$, $p=0.016<0.05$). According to CPTED practice in different countries, white-colored, bright light is the best solution for illumination of parking areas (Hushen, 2014).
- ✚ Territoriality strategy – the usage of signage such as 'Private Property' or 'No Trespassing' or 'Hours of Usage', and 'No Vehicle Traffic' is related to thefts from vehicles ($\eta^2=0.890$, $p=0.016<0.05$). The signage brings order into the site aesthetics, as well as controlling pedestrian and vehicle routes.
- ✚ Activity support strategy – the criterion 'The site is vibrant and well-used' correlates with thefts from vehicles ($\eta^2=0.890$, $p=0.016<0.05$). A vibrant and well used site generates activity, attracts more users and observers of the site. The more 'eyes on the street' the area has, the safer it is.

Robbery and Intentional damage of property

According to the correlation analysis (Eta-squared is calculated and Chi-squared test is applied) results (Table 9.2.) the same significant relations are observed for robberies and urban criteria, and for damage of property and urban criteria. Both crimes correlate with two criteria according to two CPTED strategies:

- ↘ Territoriality strategy – the visibility and good definition of entry points into the site are related to robbery and damage of property (both $\chi^2=5.000$, $p=0.025 < 0.05$). According to CPTED, it is important to clearly define the entries/exits to and from the site. Hereby, the routes of pedestrians and vehicles are directed to the proper areas within the site and in the right directions.
- ↘ Access control strategy – the separation of visitors parking from employees is related to robbery and damage of property (both $\chi^2=5.000$, $p=0.025 < 0.05$). The separation of different zones within the site is important for a better control of pedestrian and vehicles routes, as well as for the easy identification of potential criminals on site.

		Theft from motor vehicle	Robbery	Intentional damage of property
Surveillance	White color light is installed for the parking lot	$\eta^2=0.890$ $p=0.016$		
Territoriality	Entry points into the site are visible and well-defined (different paving material, changes in street elevation, architectural, and landscape design, signs, gates)		$\chi^2=5.000$ $p=0.025$	$\chi^2=5.000$ $p=0.025$
	Signage such as Private Property—No Trespassing, Hours of Usage, and No Vehicle Traffic is used on the site	$\eta^2=0.890$ $p=0.016$		
Access control	Visitors parking separated from employees		$\chi^2=5.000$ $p=0.025$	$\chi^2=5.000$ $p=0.025$
Activity support	The site is vibrant and well-used	$\eta^2=0.890$ $p=0.016$		

Table 9.2. Relations between crimes and factors of urban environment

9.4. Conclusions and Recommendations

Comparison of Soviet-time, fully reconstructed and newly built commercial objects reveals that in Soviet-time commercial objects with parking lots it is harder to implement activity support, though it is possible and requires more effort. In many cases, inner spaces of the building have to be transformed and site areas have to be re-located. This notwithstanding, Kreves st. 43 is a good example of re-use of the Soviet building with a parking lot for the contemporary needs. Regarding surveillance, territoriality, access control and maintenance CPTED strategies, no significant difference is observed between all analyzed types of objects.

Comparing research results according to all five CPTED strategies allows us to identify the strengths and weaknesses of parking lots of commercial objects. Activity support is the strongest side (Soviet-time, fully reconstructed and newly built commercial objects fulfil the requirement of this strategy for 73.32%). Most commercial sites are vibrant and well used, there is a diverse range of land-uses at the sites, and the objects have restaurants / cafes / cinemas / play areas to attract people.

According to the correlation analysis results, significant and very strong relations are observed for white color lighting at parking areas and theft from motor vehicle ($\eta^2=0.890$, $p=0.016$), visibility and good definition of entry points into the site and robbery as well damage of property (both $\chi^2=5.000$, $p=0.025$), signage on the site and theft from motor vehicle ($\eta^2=0.890$, $p=0.016$), separation of visitors parking from employees and robbery as well as damage of property (both $\chi^2=5.000$, $p=0.025$), vibrancy and good usage of site and theft from motor vehicle ($\eta^2=0.890$, $p=0.016$). Based on the correlation analysis results and site assessment data, recommendations for safety improvement according to CPTED strategies are provided:

- ✎ Territoriality. There still is much to be done to improve elements of territoriality (as only 41.1% of observed criteria meet territoriality requirements). There should be signs to locate where you are. No confusing zones/levels should be on the site. The street address must be clearly visible from the street with numbers a minimum of 12.7 cm high and made of non-reflective material. Parking areas should be clearly marked and separated from pedestrian walkways. Entry points into the parking area should be visible and well-defined (different paving material, changes in street elevation, architectural, and landscape design, signs, gates). Property lines and private areas must be defined with plants, pavement treatments, short walls, or fences. There should be a signage used on the site such as Private Property—No Trespassing, Hours of Usage, and No Vehicle Traffic. Businesses should be identified by wall signs for those parking in the rear.
- ✎ Access control is also a weak side of parking lots of commercial objects in Lithuania. Only 42% of observed criteria meet access control requirements. There should be no pathways that lead to unpredictable places. Visitors parking must be separated from employee' s parking. Pedestrian

paths must be separated from vehicles. Landscaping should be used to divide the parking areas into smaller lots (applies for larger parking lots). Cut-through or high-speed traffic must be discouraged in this space. Dead-end spaces should be blocked off with fences or gates. There should be a security / police present at the site.

- ✎ Surveillance. 45.44% of observed criteria meet natural surveillance requirements. The main rule of good natural surveillance is that a person can be seen or heard everywhere and always. There should be no blind spots or hiding areas on the site, as well as no places where offenders could easily hide and conceal themselves. Loading areas and landscaping should not create hiding places. There should be clear visibility maintained from inside the business to the street, sidewalk and parking areas. Window signs must not cover more than 10% of window space. Angled or perpendicular parking in front of stores should be used rather than parallel to allow greater visibility between cars. The street address numbers, parking lots, footpaths, exterior, access to the building, walls, corners, closest surroundings should be clearly lighted at night. White color has to be installed for parking lighting. Lighting should not glare into the eyes, and it should be placed in such a way that it allows people to be recognized from 7.62 meters away. Pedestrian scale street lighting should be used in high pedestrian traffic areas to help people recognize potential threats at night. There should be no blind walls, or public art can be used for blind walls to decrease crime.

- ✎ Maintenance. 47.33% of observed criteria meet maintenance requirements. To reduce crime, the aesthetics of the site has to be attractive to people. The site and closest surroundings have to be well-maintained and cared for. There should be no empty buildings or spaces, no old, abandoned automobiles or other vehicles stored on the site (including inappropriate outdoor storage). There should be no presence of drunkenness or nuisance, no evidence of rubbish, graffiti or vandalism. All the structures should be painted and in a condition of good repair. Landscaping should be tidy and in good repair. Weeds must be abated, bushes must be up to 0.91 meters high, trees must be pruned up to 2.13 meters from the ground. Trees and shrubs should be pruned back from windows, doors, and walkways. Exterior lighting has to be maintained. Parking areas have to be of high standard without pot-holes or trash. No faded posters, broken signs, and other displays that are beyond their useful lives.

The questionnaire that is developed for this research in many points is close to the questionnaire presented in the CEN/TR 14383-7:2009 Standard (in CEN parts 5.4 and 5.5). Though, our questionnaire is more expanded and adding more aspects for the safety assessment and audit of buildings and sites (with a concentration on parking areas). Therefore, it might be used as a practical annex to the Standard.

Conclusions

By Inga Stankevice (Lithuania) and Mike Turner (Israel)

In the book, various insights vectoring public transportation systems towards greater safety are gathered. The insights are based on a number of valuable lessons arising from different social and cultural contexts, from thorough analysis of the best international practices, and from the close collaboration of academics with public authorities, representatives of transport companies, and with end-users who comprise a significant part of a transportation system on daily basis.

The UNHabitat New Urban Agenda and accompanying European Policies highlight the need to "support the provision of well-designed networks of safe, inclusive for all inhabitants, accessible, green, and quality public spaces and streets, free from crime and violence." Without doubt, it does not make much sense to repeat the recommendations provided by the authors of this book in its finalizing part. Yes, all the recommendations are aimed at increasing safety of public transportation systems, and while some of them are rather underlying and general, others include concrete numbers, such as the suggested maximum height of trees in meters, minimum size of street addresses in centimeters and bus stop shelter descriptions. All these suggestions and their groundings are easily accessible via the prior pages of the book, whereas what is truly important to mention here is discussed below.

First, we must admit that a design which fosters security should be integrated into existing infrastructures and should consider different attributes of segments of the society it serves. For example, in this book, authors who analyze very similar objects – a bus station and a railway station, – but who apply their knowledge in different societies represent same points of departure, but different investigation paths and conclusions. Where the major threat is related to external dangers e.g. terrorism, the authors focus on security procedures and their attributes, such as CCTV, emergency buttons, or narrow openings of garbage cans. Whereas if external dangers are less tangible, the authors emphasize the importance of means to prevent interpersonal conflicts: the quality of amenities, the profusion of available spaces which can accommodate a large variety of activities in spite of promiscuity or the density of use, and the high-quality services which remind their users about the standard social interaction rules, such as being polite and respectful. The two perspectives are very different, but taken together, they comprise a nearly full picture of how to increase a station' s security which is often exposed to both external and internal threats.

Another aspect of clashing social and cultural environments is that same mechanisms may lead to different results as the mechanisms are highly dependent on broader systems in which they are embedded. Hence, it is not accidental that there are so many conceptual approaches towards public safety and so many various strategies to increase it. The thing is that the given field of research is mostly based on case studies which are difficult to integrate into a single complex and coherent

theory. And most likely, such a theory is not even needed because safety hazards, just as social constructs where they appear, evolve constantly, and therefore, strategies for security in public transport have to be flexible and easily modifiable too.

This is why some authors of the book were condemned to present conclusions which do not fully correspond to the Standard CEN 14383. For example, in some societies, better visibility and connectivity mean better opportunities for offenders to attack and run away rather than natural surveillance preventing from crime, and more intense pedestrian flows mean more victims on a street rather than more eyes on it. Even though some well-known aspects which inhibit crime function properly in such societies (e.g. the proximity of doors and windows), others simply don't due to surprisingly inert social reaction to hazards and offence.

Hence, in addition to technical crime prevention means, it is necessary to develop effective social programs educating the sense of joint responsibility and positive ownership. A very revealing example of such a social-educational experiment is described in this book. It involved neighbourhood patrols, performances in classrooms for children and youngsters, trainings for better communication skills, conflict resolution, sensitivity awareness, as well as physical trainings to combat physical assault, and it also included a novel, aesthetic and open design of experimental public transport facilities.

And this unique experiment brings us further to the second important message which it is necessary to shed light upon in this conclusive piece of work. In spite of the varied backgrounds of the authors, they all, in one or another way, agree that the feeling of safety and security is based on joint and balanced initiatives of local authorities, communities, police, businessmen, professionals, academics, end-users and so on, as measures for increasing safety of a public transport system and its facilities. It is true that aesthetic quality of the facilities increases safety, but it is even safer if their users have conflict resolution skills. It is true that proper lighting may inhibit crime, but only if people do not stay apathetic and unresponsive towards others being in trouble. It is true that greenery attracts pedestrian flows, but only if it does not create deadlocks and poor visibility. And it is true that crime prevention policies should be complex and proactive rather than reactive. Therefore, we invited a broad audience to read this book and apply its lessons at a proper time, at a proper place, with a proper joint effort.

Appendix 1

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